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LIST OF SUMMARIES

I.	REIMBURSEMENT PATTERNS UNDER MEDICARE AND MEDICAID	Ira Burney and Jon Gabel Health Care Financing Administration
II.	INTERIM RESEARCH FINDINGS ON PHYSICIAN REIMBURSEMENT UNDER MEDICARE	Charlotte F. Muller and Jonah Otelsberg, City University of New York
III.	RESULTS FROM A NATIONAL SURVEY OF 2,000 PHYSICIANS: MEDICAID PARTICIPATION, PHYSICIAN BAD DEBT, AND DIRECT THIRD PARTY PAYMENT	Frank Sloan, Jerry Cromwell and Janet Mitchell, formerly of Abt Associates
IV.	THE PATTERNS OF PHYSICIAN CHARGES: IMPLICATIONS FOR POLICY	William Hsiao, Amy Taylor and Philip Lurie, Harvard University
V.	PHYSICIAN BEHAVIOR DURING WAGE PRICE CONTROLS IN CALIFORNIA	John Holahan, Jack Hadley, Robert Lee and William Scanlon, The Urban Institute
VI.	CANADIAN PHYSICIANS' SUPPLY RESPONSE TO UNIVERSAL HEALTH INSURANCE: THE FIRST FIVE YEARS IN QUEBEC	Charles Berry, Philip Held, Barbara Kehrer, Larry Manaheim and Uwe Reinhardt, Mathematica, Inc.
VII.	VIRGINIA PHYSICIAN RESPONSES TO CHANGES IN CODING TERMINOLOGY: IS THERE EVIDENCE OF CREEPING PROCEDURAL INFLATION?	Alan Newman, The Computer Company
VIII.	PHYSICIAN INVOLVEMENT IN HOSPITAL DECISION MAKING	Michael Redisch, U.S. General Accounting Office
IX.	THE EFFECT OF MEDICAL STAFF CHARACTERISTICS ON HOSPITAL CARE	Mark Pauly, Northwestern University
X.	STUDY OF REIMBURSEMENT AND PRACTICE ARRANGEMENTS OF HOSPITAL-BASED PHYSICIANS	Sam Mitchell, Thomas Shaffert and Robert Schlenker, Arthur Andersen and InterStudy
XI.	PER CASE REIMBURSEMENT FOR MEDICAL CARE: EFFECTS UPON HOSPITAL UTILIZATION	Gene Markel, Pennsylvania Blue Shield
XII.	SMALL AREA ANALYSIS OF SURGERY RATES	Jack Wennberg, Harvard University
XIII.	SECOND SURGICAL OPINION: SALVATION OR SHAM	Eugene G. McCarthy, Cornell University
XIV.	UTILIZATION REVIEW IN THE UNITED STATES: RESULTS FROM A 1976 NATIONAL SURVEY OF HOSPITALS	Paul Gertman, Jennifer Anderson, Alan Monheit and J. Breckenridge Eagle, Boston University Medical Center

Reimbursement Patterns Under Medicare and Medicaid

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Introduction

Few areas have greater potential for increasing efficiency in the health care system than the manner for reimbursing physicians. While expenditures for physician services account for only about 19 percent of health care spending the physician is the central decision maker who determines utilization patterns for an estimated 70 percent of all health services. Thus the incentives contained in physician payment systems can influence access, cost and the quality of services in the entire health care system. This paper uses data from two national surveys to describe the patterns of physician payments under Medicare and Medicaid and how they may affect beneficiary access and physician distribution.

The Medicare and Medicaid programs represent quite different approaches to financing health care. Medicare is similar to private health insurance plans while Medicaid is state-run and based on welfare principles. The reimbursement philosophies of Medicare and Medicaid reflect these differences: Medicare was designed to reflect the private market while Medicaid delegated states almost complete discretion. Despite these differences both Medicare and Medicaid operate almost exclusively through the fee-for-service system.

Under the fee-for-service system there are two major variants used by third parties for determining how much to pay physicians. These two methods are fee schedules and the customary, prevailing and reasonable charges (CPR). Fee schedules are used by about half the Medicaid states, for about half of Blue Shield enrollees and by many commercial insurors. Fee schedules specify a maximum dollar amount that the insuror will reimburse for the procedure. The customary, prevailing and reasonable charge method (also known as usual, customary and reasonable charges--UCR), is uniquely American. Medicare, half the Medicaid states, about half of Blue Shield enrollees and the larger commercial

insurors employ this method. Under CPR, the reimbursement rate, known as the reasonable charge, is the lowest of the physician's actual billed charge for that procedure, his customary charge for that service and the prevailing charge in the local geographic area. While they have precise statistical definitions, the customary charge is supposed to represent what that individual physician usually charges and the prevailing charge is designed to represent the charge generally made by most physicians in the area. Thus, one way to think about CPR is as a dual fee schedule--one customized to the individual physician and the other tailored to the general charges of all physicians in the local area.

In addition to varying payment methods, differences between Medicare and Medicaid exist in the administration of reimbursement. Medicare contracts with 47 private insurance companies (known as carriers) while about three fifths of the states use fiscal agents in some capacity. While Medicare establishes uniform rules in implementing CPR reimbursement, the carriers have discretion over numerous operational decisions. For example, in 1975, all but seven carriers had separate reimbursement screens for general practitioners and specialists and they divided the country nearly 300 reimbursement areas (known as reasonable charge localities). In contrast, under Medicaid half the states have separate reimbursement rates for specialists and two-thirds of the states use statewide areas while the others generally use the Medicare definition of localities.

Results

In 1975 HEW surveyed the nation's Medicare carriers and state Medicaid agencies requesting data on prevailing charges or maximum allowable fees for high volume and high dollar procedures for each reimbursement locality for both general practitioners and the specialists who performed the procedure most frequently. Twenty-nine procedures wer common to both surveys. Based upon a national basket

of Medicare goods, we constructed three kinds of fee indices for each county. The first compares local Medicare fees to a national Medicare average of 100, the second compares local Medicaid fees to a national Medicaid average of 100 and the third compares local Medicaid fees to local Medicare fees.

Table 1 shows average fee indices for SMSAs (Standard Metropolitan Statistical Areas) and non-SMSA counties from least to most populated county groupings. The data show a gradient of Medicare fees increasing with county size. For example, Medicare fees in the largest SMSAs (New York, Chicago and Los Angeles) average 35 percent more than the national average and fees average eight percent less than the national average in the smallest counties. In contrast since the majority of states use statewide reimbursement areas there is virtually no relation between fees and county size under Medicaid.

To parcel out the effects of differences in physician input prices which might be reflected in fee differences, we adjusted the fee indices for each county for cost of living differences (a proxy for factor prices). These adjusted fee indices, also displayed in Table 1, show that while cost of living factors account for some of the Medicare fee differences, nevertheless some price differences still remain. For example, Medicare fees in the largest SMSAs average 17 percent greater than the national average and average eight percent less than the national average in the least populated counties. Because there was little fee variation before adjustment, Medicaid fees are inversely related to county population after adjustment.

Table 1 also shows that nationally Medicaid fees average 77 percent of Medicare fees for specialists. In addition, that data show that Medicaid fees are on average most competitive with Medicare fees in rural counties but are on average

least competitive with Medicare fees in the most populous counties. For example Medicaid fees average 92 percent of Medicare fees in the smallest counties but average 56 percent in the three largest SMSAs.

Table 2 shows average fee indices for quintile groupings of county physician to population ratios. The data show that on average Medicare fees are higher in the physician richer counties (counties with more than 103 physicians per 100,000 population exceeded those with less than 36 physicians per 100,000 by 25 percent) whereas Medicaid fees exhibit the reverse pattern. Similarly, the Medicaid/Medicare fee index indicates that Medicaid fees are on average least competitive with Medicare fees in physician rich areas where they average 72 percent of Medicare fees and most competitive in physician poor counties where they average 94 percent of Medicare.

A few comments about these results are in order. First, part of the explanation of the Medicaid distribution is quite simple--two-thirds of the state have no intra-state fee variation. Second, a caution about inferences concerning access to care for low income persons is that Medicaid benefit package restrictions and eligibility limitations may also have significant effects. States have discretion to limit the "amount, duration and scope" of services or to define income eligibility ceilings to exclude numerous poor persons from Medicaid benefits. For example, many of the rural southern states where Medicaid fees are most competitive with Medicare often restrict services to one physician visit per month or do not have "medically needy" programs. Thus to improve access to care for low income persons, a three pronged policy simultaneously addressing benefits, eligibility and reimbursement may be necessary.

Up to this point we have assumed that since Medicare reimbursement policy was designed to pay the "going rate" Medicare fees are competitive with those of other third parties. The most comprehensive evidence comparing reimbursement levels for the public programs with those of private insurors comes from the national survey of 2,000 physicians conducted by Sloan et al. under contract to HCFA. Physicians were asked to report their usual fee and the reimbursement rate they usually receive from Medicare, Medicaid and the "best" Blue Shield plan for seven specific medical procedures (See Table 3).

For the follow-up office visit, which may be a fairly good indicator of access to care, Medicare and Blue Shield fees are rather close (the best Blue Shield fees average five percent greater than Medicare). Similarly, for four of the other six procedures, Medicare fees average at least 92 percent of the best Blue Shield plan. Both Medicare and Blue Shield fees are on average 75 to 80 percent of what physicians report they usually charge--the so-called "list" price. The implication is that measured by reimbursement levels, (and excluding coinsurance differences), in seeking access to care, Medicare patients are on about the same footing as patients insured by Blue Shield.

Between 1968 and 1972, HEW maintained a computerized file of five percent of Medicare claims. Table 4 shows that between these two periods, Medicare mean allowed charges increased at greater rates for the more technically oriented specialists. Reimbursement rates for the primary care specialties--general practice and internal medicine--increased at slower rates than those for general surgeons or some of the surgical specialties. Similarly, table 5 shows summary comparisons of statistically significant differences in mean Medicare general practitioner and specialist fees from Schieber et al. The data show statistically significant differences for 27 of 39 procedures though differences

were generally less than 10 percent. Morover, of the procedures with statisically significant differences, the types of services with higher specialist than general practitioner fees were medical visits and surgery which represent about three-quarters of Medicare reimbursements.

It is difficult to assess the effect of these differences on physician specialty decisions. A skeptic may find that an absolute difference of three and one-half percent in the annual rate of increase in Medicare mean allowed charges between surgeons and internists insignificant in influencing specialty choices. An elaborate behavioral model using fees and other relevant variables will be necessary to assess the magnitude of these effects.

Conclusion

There is a need to understand what factors account for the Medicare fee differences in more physician dense areas, in larger SMSAs (differences that remain even after adjusting for cost of living) and amongst specialties. Similarly, there is a need to understand what affects these differences have on physician behavior and what effects changes in the fees would have on physician behavior. For example, Redisch et al. recently found that physicians in physician rich areas have 39 percent fewer patient visits per week although they work nearly equivalent hours to their peers in physician scarce counties. While there may be quality differences in patient visits among these areas, in effect Medicare, and similar third party payors, may tacitly reinforce alternative styles of physician practice. A final factor to bear in mind is that Medicare and Medicaid represent a lever on only one-fifth of the system. The implications of policy changes using the Federal programs alone must be considered since key lessons from prior tinkering with Medicare and Medicaid alone indicate that adverse consequences for beneficiaries of these programs will result.

Table 1: Medicare and Medicaid Specialist Fee Indices in SMSAs and Non-Metropolitan Counties, 1975

SMSA/Non-SMSA Population	Unadjusted Fee Indices			Adjusted Fee Indices	
	Medicare	Medicaid	Medicaid / Medicare	Medicare	Medicaid
All Counties	100	100	77	100	100
Counties in SMSAs					
SMSAs over 5 million	135	96	56	117	86
SMSAs 3-5 million	104	90	65	94	81
SMSAs 2-3 million	105	97	70	103	95
SMSAs 1-2 million	103	105	77	102	104
SMSAs .5-1 million	100	103	77	101	105
SMSAs .25-.5 million	96	104	80	97	105
SMSAs under .25 million	89	102	85	93	107
Non-Metropolitan Counties					
Counties > 50,000	88	96	82	96	105
Counties 25,000-50,000	83	100	91	92	111
Counties 10,000-24,999	82	102	93	92	114
Counties < 10,000	82	103	92	92	114

Table 2: Medicare and Medicaid Specialist Fee Indices
By County Physician to Population Ratio, 1975

County Physicians Per 100,000 Pop.	Number of Counties	Medicare	Medicaid	Medicaid / Medicare
All counties	3074	100	100	77
Less than 36	701	85	107	94
37 to 52	641	83	100	90
53 to 69	586	85	99	88
70 to 102	627	91	99	82
Greater than 103	519	106	99	72

Table 3:

MEAN USUAL FEES AND INSURER FEE SCHEDULES ($)

PROCEDURE	INSURER			
	Usual Fee	Blue Shield's "Best Schedule"	Medicare's Usual Payment	Medicaid's Fee Schedule
Follow-up Visit in the Hospital on the Day After a Patient is Admitted	$13.93	$10.73	$10.00	$7.63
Routine Follow-up Visit in the Office	11.59	9.22	8.79	7.20
Inguinal Hernia Repair	303.97	244.82	233.21	170.57
Diagnostic D and C	149.06	113.97	104.43	76.72
Complete Blood Count	8.04	7.79	6.17	5.63
Suture of a Simple Laceration	22.26	19.04	16.55	13.68
Electrocardiogram	19.66	17.05	15.76	13.47

Reproduced from: F. Sloan, J. Cromwell and J. Mitchell, A Study of Administrative Costs in Physicians' Offices and Medicaid participation, Abt Associates, 1977

Table 4: Rate of Change in Medicare Mean Allowed Charges in Selected Specialties, 1968-1972

Specialty	Four Year Change (in Percent)	Annual Rate of Change (in percent)
All specialties	23	5.3
Orthopedic Surgery	41	9.0
Anesthesiology	39	8.6
General Surgery	35	7.8
Ophthalmology	24	5.5
Other Specialties	19	4.4
Urology	18	4.2
Internal Medicine	18	4.2
General Practice	13	3.1
Radiology	11	2.6

Table 5: Summary of Statistically Significant Differences Between Mean General Practitioner and Specialist Fees, 1975

Type of Service	Number of Procedures	Number of Procedures With Statistically Significant Differences	
		Total	Cases where Mean Specialist Fee is Greater than General Practitioner Fee
All Services	39	27	19
Medical Visits	4	4	4
Surgery	18	12	12
Radiology	6	2	1
Laboratory	11	9	2

INTERIM RESEARCH FINDINGS ON PHYSICIAN REIMBURSEMENT UNDER MEDICARE

Contract #600-76-0145

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TABLE OF CONTENTS

Data Sources	1
Method of Study	1
Fee Distributions	2
Carrier Performance Measures	3
Fee Regressions	4
Findings on Performance of Carriers	5
Assignment Rate	6
Tables	7
Appendix	13

LIST OF TABLES

Table	Title	Page
I	1977 50th Percentile Medicare Fees by Type of Doctor and Procedure, Outliers Deleted	7
II	Results of Regression of Fees on Selected Area Resource File Variables	8
III	Assignment Rate As A Percent of Claims Processed by Carrier Type and Medicare Region, FY 1976	9
IV	Claims Denied and Claims Investigated, As A Percent of Claims Processed by Carrier Type, FY 1976	10
V	Preliminary Regression Results on Determination of Net Assignment Rate, 1976	11
Appendix - Data Sources		13

Under its contract the CUNY Physician Project is charged with "examining the effects of various discretionary administrative practices of third party programs in determining reimbursement for physician services provided to program eligibles on a fee for service basis upon measures of fee levels and upon program expenditures and performance".

Data Sources

Data for the study came from four sources:

I. Medicare data from BHI

II. Carrier data from New York City Blue Shield and GHI

III. Medicaid data from New York City Medicaid

IV. Socioeconomic data from Area Resource File (ARF6)

V. AMA Physician Distribution Statistics

All the data were obtained on tape whenever possible.

Method of Study

The CUNY study is divided into two major parts. The first part uses relevant data for all carriers, the second (pilot) analyzes two carriers in the New York City area.

The national study is almost completed. Data for the pilot are now being accumulated and prepared for analysis.

Since most of the data came from administrative records and other secondary sources, early tasks involved becoming familiar with the data sets and cleaning up files. For measures of interest we produced scatter diagrams and descriptive statistics including measures of central tendency and skewness. Outlier observations outside the interval defined by mean ± 3 standard deviations were eliminated from the analysis of interrelationship of variables.

The following analyses have been completed:

1. Carrier fees - 50th percentile and prevailing for FY 1976 and FY 1977.
2. Carrier discretionary practices as reflected in replies to IM 75-53.
3. Carrier performance as measured by workload and processing time measures.
4. Relationship of fees to socioeconomic variables.
5. Relationship of assignment rates to socioeconomic variables and measures of carrier performance.

Still to be completed:

1. National study:
   a) relationship of fees to socioeconomic variables, discretionary practices and performance measures
2. Pilot:
   a) Analysis of carrier history with special attention given to provider and beneficiary profile.
   b) Simulation of carrier discretionary practices on determination of reasonable charge fees.

Fee Distributions

To study carrier-wide levels of fees under Medicare, the 50th percentile fee, the midpoint of the distribution of weighted customary fees, was used as a measure. The customary fee for each physician is the median of submitted charges. The 50th percentile fee in each Medicare locality is generated separately for general practitioners and specialists unless the carrier combines all physicians performing a procedure into one group. By averaging localities, carrier means by procedure were formed and expressed as a ratio to the national

how were localities weighted ?

how are procedures weighted, to get to

mean fee. When ratios for 50 leading procedures combined were compared to the national level, a generalized measure of relative prices was created.

Analysis of fee distributions shows a variable relationship between GP and specialist fees. For an initial comprehensive office visit, the 50th percentile fee varied from $5 to $64 for GPs and from $15 to $75 for specialists, with means of $29 and $41 respectively. The mean specialist fee for reduction of a fracture of the neck of the femur, a common procedure within an aged population, was only slightly higher than the GP mean - $734 and $725, while the mean GP fee for a radical mastectomy was slightly higher than the specialist fee. The coefficient of variation showed that for some carriers certain procedures are close to the national price level while others are much higher than the national level, whereas for other carriers there is more homogeneity of Medicare fees.

Carrier Performance Measures

One aspect of carrier performance as indicated in statistics that are presented in or can be derived from the Workload Report is attentiveness to Medicare control-type regulations, resulting in claims investigation, denial, and reduction, thus keeping program expenditures down. Another aspect is speed in processing claims, which is favorable to physician acceptance of Medicare as a prime source of direct revenue, i.e., willingness to accept assignment. Claims reduction and denial, however, are negative events from the viewpoint of practicing physicians. All aspects of carrier performance ultimately affect patient costs and utilization under Medicare, largely through the choices exercised by physicians to circumvent allowed-charge controls on their revenue by refusal to accept assignment. This suggests that different carrier performance goals may be in conflict, and that there

is need to adjust priorities to conditions in an area.

Still another aspect of carrier performance is the selection of available options within the process of reasonable charge determination, such as merger of "private business" claims with Medicare, procedures followed when a physician has an insufficient data base for profile development, and specialty qualifications. These discretionary practices are difficult to identify and classify precisely but are included in the CUNY study.

Fee Regressions

In order to isolate the effect of carrier practices and performance on fees, control for local conditions affecting the physician service market is necessary. Hence preliminary regressions were run to evaluate the effect of socioeconomic and health resource factors on fees. Results were similar for unweighted fee indices and for fee indices weighted by actual local frequencies. The results summarized here are for unweighted fee indices and for SMI expenditure per enrollee, another indicator of Medicare prices. "Outlier" fee values were eliminated in all regression equations. Selection of variables for trial was based on study of a zero-order correlation matrix on factor analysis. A few variables selected from HEW's Area Resource File explained between 51 and 72 percent of the variance of the different fee measures used. The ARF variables were all expressed as ratios to the national mean but in several cases composite variables were created to correct for scale, e.g., population per active MD.

Family income was a significant positive factor in 4 of the 7 equations estimated, ambulatory visits per bed in 6; osteopathic supply had a significant negative influence in 3 equations. Percent urban population had

a significant positive effect in 6 equations, possibly capturing concentration of aged in an area as well as other urban-related market forces. The significant positive effect of population per active MD is of interest because it conforms with conventional demand/supply analysis.

Final fee regressions will be run using factor analysis to select from available carrier variables on discretionary practices, statistics on mean claims processing time, denial rate and other performance measures, and socio-economic variables selected on the basis of the preliminary fee regressions to eliminate multicollinearity. Outlying values will be deleted for socio-economic and carrier performance variables.

Findings on Performance of Carriers

Other interim findings concern carrier differences in performance. An average of 48.0% of claims nationwide were assigned. The proportion ranged from about 20% for Equitable-Wyoming to 77.2% for Rhode Island Physicians Service. (Oklahoma Department of Public Welfare had 97.2% of claims assigned.) Variation by type of carrier and region was substantial. The Workload Report also showed a claims denial rate averaging 5.5% for assigned claims and 7.0% for unassigned claims in FY 1976. Carriers in the Chicago region had the highest denial rates for all claims and for assigned claims, but carriers in the Dallas region had high rates of denial for unassigned claims (8.4%). The national rate of investigation for all claims submitted on form 1490 and 1491, used for individual practices, is 10.5%, with the rate for unassigned claims being almost double that for assigned claims. Processing time averaged 13.6 days for assigned claims, 16.7 days for unassigned - but Travelers-Virginia processed claims in 6.7 days average time

and GHI-New York in 36.6 days. Interpretation of investigation and denial rates in terms of carrier differences and additional time and inputs for assigned claims should take into account varying size and complexity of claims.

Assignment Rate

Preliminary regression results on determination of assignment rate are available. The regression trials were run to examine the effect of carrier processing performance on assignment when account is taken of socio-economic factors. Results showed that such carrier performance characteristics as claims investigation and denial rates influenced assignment rates. A substantial proportion of the variance is explained. However, no clear effect is shown as yet for measures of efficiency based on processing time and changes in stock of pending claims. Single-year data do not permit study of a lag between perceived efficiency and physician response.

Later reports will concern the outcomes of simulations of changes in the reasonable charge process using GHI-New York and Blue Shield-New York data and on physician and beneficiary behavior as revealed by claims history files of these two carriers.

Table I

1977 50th Percentile Medicare Fees By Type of Doctor and Procedure - U.S.A., Outliers Deleted

Procedure and 64 CRVS Code	General Practitioners					Specialists				
	Number of Cases	Maximum	Minimum	Mean	Standard Deviation	Number of Cases	Maximum	Minimum	Mean	Standard Deviation
1. Initial Limited Office Visit (9000) New Patient	246	25.00	7.00	13.03	3.20	244	37.20	3.00	17.29	5.64
2. Initial Comprehensive Office Visit (9002) New Patient	264	63.80	5.00	28.77	12.69	263	75.00	15.00	40.74	12.19
3. Minimal Office Visit - Established Patient (9003)	195	12.00	1.00	5.36	2.29	201	13.00	1.00	5.76	2.49
4. Routine Followup Brief Office Visit (9004) Established Patient	255	13.00	6.00	8.63	1.49	254	15.00	6.40	10.48	2.00
5. Routine Followup Brief Home Visit (9014)	260	22.50	7.00	13.50	3.49	261	25.00	5.20	16.05	4.17
6. Initial Brief Hospital Visit	240	42.00	6.00	25.03	7.04	239	50.00	10.00	30.08	8.24
7. Initial Comprehensive Hospital Visit (9022)	248	63.80	6.00	36.55	11.47	247	80.00	20.00	46.15	11.73
8. Routine Followup Brief Hospital Visit (9024)	259	15.00	5.00	9.70	2.32	258	20.00	5.00	11.55	3.04
9. Biopsy Skin (0171)	249	35.00	9.60	20.20	5.42	259	50.00	10.00	26.44	8.75
10. Radical Mastectomy (0470)	217	880.00	400.00	622.96	141.79	260	1000.00	400.00	616.60	143.27
11. Reduction of Fracture - Neck of Femur (0868)	192	1100.00	200.00	724.66	209.92	212	1450.00	429.00	734.28	181.86
12. Arthrotomy - Puncture for Aspiration of Joint Effusion (1046)	244	25.00	4.00	13.98	3.79	234	30.00	5.00	15.97	4.45
13. Needle Puncture of Bursa (1413)	236	25.00	4.40	14.41	3.95	241	30.00	5.00	15.64	4.30
14. Bronchoscopy (2111)	203	225.00	95.00	146.69	22.19	260	200.00	75.00	140.18	27.71
15. Thoracentesis (2183)	248	50.00	10.00	26.61	6.32	259	70.00	7.80	34.93	10.38

Table II

Results Of Regression Of Fees On Selected Area Resource File Variables

Dependent Variables	R^2	Independent Variables: Intercept	FAMINC69	PCTAGED	POPACT	AMBVSBED	PCTURBAN	TOTMDENR	TOTDO74
GP77I50	.61 (.0001)	+.493	+.249 (.031)	-.259 (.0004)	+.171 (.021)		+.297 (.003)		
SP77I50	.54 (.0001)	+.092			+.232 (.0017)	+.150 (.0002)	+.493 (.0001)		
C77I50	.56 (.0001)	+.067			+.247 (.0005)	+.165 (.0001)	+.483 (.0001)		
GP76I50	.49 (.0001)	+.815	+.390 (.0001)	-.233 (.002)					
SP76I50	.62 (.0001)	+.003			+.287 (.0002)	+.160 (.0001)	+.525 (.0001)	+.038 (.0106)	-.025 (.0027)
C76I50	.65 (.0001)	-.105	+.246 (.034)		+.309 (.0001)	+.124 (.003)	+.397 (.0001)	+.038 (.008)	-.023 (.0041)
SMI75ENR	.65 (.0001)	+.045				+.222 (.0007)	+.733 (.0001)		

Note: Figures in parenthesis indicate the level of significance.

GP77I50, SP77I50, C77I50 - Fee indices of 1977 50th percentiles
GP76I50, SP76I50, C76I50 - Fee indices of 1976 50th percentiles
SMI75ENR - 1975 SMI expenditure per enrollee
FAMINC69 - Median family income 1969
PCTAGED - Percent aged in total population
POPACT - Population per active physicians
AMBVSBED - Ambulatory visits per bed
PCTURBAN - Percent of 1970 population residing in urban areas
TOTMDENR - Total enrollment in medical schools
TOTDO74 - Doctors of osteopathy patient care with other
IRNGH75 - Full time interns and residents, non-general hospitals
PCTCBED - Extensive care beds as a percent of total hospital beds

Variables shown are those that entered the regression equations. Those considered are:
Demand - FAMINC69, SCHOOL70, MORT6574, PCTAGED
Supply - POPACT, EXPBED, AMBVSBED
Urban - PCTURBAN, DENSITY
Independent factors - TOTMDENR, TOTDO74, IRNGH75, PCTCBED

All variables are expressed as ratios to national mean.

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Assignment Rate As A Percent of Claims Processed
by Carrier Type and Medicare Region, FY 1976

Carrier Type	Assignment Rate
Total U.S.A.	48.0%
Blue Shield	51.0
Private for one area	50.0
Prudential	53.6
Metropolitan	57.4
Travelers	54.2
Nationwide	44.8
Equitable	36.2
Aetna	30.7
Group Health Insurance	43.4
Region	**Assignment Rate**
Total U.S.A.	48.0%
Boston	64.7
New York	50.9
Philadelphia	56.9
Atlanta	56.1
Chicago	42.3
Dallas	55.5
Kansas City	41.8
Denver	34.5
San Francisco	39.2
Seattle	32.3

Source: Part B Workload File I

CLAIMS DENIED AND CLAIMS INVESTIGATED, AS A PERCENT OF CLAIMS PROCESSED BY CARRIER TYPE, FY 1976

	Claims Denied as Percent of Claims Processed			Claims Investigated as Percent of Claims Processed		
	Total	Assigned	Unassigned	Total	Assigned	Unassigned
Total USA	6.0%	5.5%	7.0%	10.5%	7.3%	14.2%
Blue Shield	5.7	5.2	6.6	10.4	7.4	14.3
Private for one area	6.6	6.1	8.2	10.9	5.9	16.2
Prudential	5.4	4.5	6.5	9.7	5.2	15.1
Metropolitan	6.5	4.4	9.5	9.0	7.3	11.3
Travelers	5.1	4.1	6.7	13.8	9.2	21.0
Nationwide	7.5	7.0	8.4	14.7	10.0	19.0
Equitable	6.4	5.6	7.1	10.9	8.0	12.6
Aetna	6.8	7.0	6.8	9.9	7.4	10.9
Group Health Insurance	5.3	5.8	5.2	6.1	6.1	6.0

Table V

Preliminary Regression Results on Determination of Net Assignment Rate, 1976

	Program-Related Variables Equation 1 Regression Coefficient	Socioeconomic Variables Equation 2 Regression Coefficient	All Independent Variables Equation 3 Regression Coefficient
R^2	.35	.44	.82
$\bar{R}^2$	.25	.33	.72
Constant	1.853	1.413	2.940
PCDENET(A)	-.283* (.092)		-.165* (.065)
PCINV(A)	-.288* (.112)		-.231* (.090)
SMI-TR/MD	-.221 (.165)		.058 (.219)
B-SHARE	-.152 (.185)		-.546* (.158)
REDBIL(A)	.113 (.305)		.445* (.218)
AVBIL(A)	-.167 (.159)		-.234* (.126)
DNMED	.088 (.070)		.155* (.049)
TPM(A)	.047 (.093)		.112* (.068)
STOKPND(A)	.002 (.005)		.005** (.004)

TABLE V (continued)

	Program-Related Variables Equation 1 Regression Coefficient	Socioeconomic Variables Equation 2 Regression Coefficient	All Independent Variables Equation 3 Regression Coefficient
AMBVSBED		.497*	-.007
		(.191)	(.158)
POP/DO74		.044*	.055*
		(.021)	(.015)
MORT65-74		.058**	.022
		(.038)	(.030)
SCHOOL70		-1.482**	-2.294*
		(1.001)	(.781)
INCPC72		-.254	1.032*
		(.481)	(.413)
POP/MDOFC		.252	.070
		(.351)	(.251)
PCTAGED		.152	-.397**
		(.252)	(.237)
PCTURBAN		.349	.046
		(.290)	(.223)
POP/MDENR		-.031	-.062*
		(.030)	(.021)

All variables are expressed as ratios to national mean.

Figures in parentheses indicate the standard error.

*Significant at 95% confidence level

**Significant at 90% confidence level

APPENDIX

Data Sources

I. Medicare Data:

1) Fee Year 1976 and 1977 fiftieth percentile and adjusted prevailing as reported by carriers for fifty most frequent procedures by locality.

   Also included are frequencies of use of procedures in the calendar year used as a basis for obtaining prevailing screens CY1974 for FY 1976 and CY 1975 for FY 1977.

2) Workload and processing time file for fee year 1976 (July 1975 - June 1976) Tape contains data collected from carriers on form SSA1565, by carrier.

3) Regional office replies to IM75-53, by carrier.

4) Medicare enrollment and reimbursement under Part B, by county, 1972 and 1975.

II. Carrier Data

The home based carriers being studied are GHI,NY (Group Health Insurance, New York) and BC/BS-GNY (Blue Cross/Blue Shield,GNY). From each of them we have obtained:

1) Claims history file for CY 1974 and CY 1976

2) Provider file

3) Customary and prevailing

III. Medicaid Data

Consists of 60 tapes containing data on services provided between January, 1973 and June 30th, 1975.

IV. Socioeconomic data

Data from Area Resource File (ARF6) May 1975 was used as the basis for socioeconomic variables. The Area Resource File contains county data taken from various sources pertaining not only to socioeconomic variables but also to supply and utilization of medical services.

A STUDY OF ADMINISTRATIVE COSTS IN PHYSICIANS' OFFICES AND MEDICAID PARTICIPATION

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A STUDY OF ADMINISTRATIVE COSTS IN PHYSICIANS' OFFICES AND MEDICAID PARTICIPATION

Private practice, fee-for-service physicians represent the mainstream of American medicine and hence are vital to the implementation of any national health policy. Yet little attention has been given to the role economic incentives play in the physicians' decisions to treat certain patients, delegate responsibility, bill patients, and administer their practices efficiently, prompting investigation in two areas: (1) physician participation in public programs such as Medicaid; and (2) organization and administration of the practice itself. These two issues are clearly interrelated. Participation in Medicaid will depend on the administrative cost of obtaining payment, fee schedules, local demand and supply variables, as well as individual physician characteristics. In order to explain participation, we thus must first understand why some physicians incur higher administrative costs than others. While part of the reason includes geographic differences in factor prices and intermediary reimbursement practices, we must also examine individual practice characteristics such as size and sharing arrangements. Finally, we expect physicians to choose a given practice mode based on individual preferences for income, leisure, and practice amenities.

An almost complete lack of reliable data on physician participation and administrative efficiency led us to conduct a nationwide survey of 2000 private practice, fee-for-service physicians in the five primary specialities: general/family practice, general surgery, pediatrics, obstetrics-gynecology, and internal medicine. Primary data were collected on physician participation in public programs, volume of services, administrative costs, physician income, fees, and group sharing arrangements. Because this information was based on physician self-reports, a major effort was made to evaluate its quality, both in terms of representativeness and accuracy.

Administrative Efficiency

Practice efficiency under alternative income and cost-sharing arrangements is explained by the neoclassical theory of entrepreneurial behavior, which has been modified to explain suboptimal outcomes within groups. Group practices may fail to achieve economies-of-scale because carte blanche is given individual physician members in defining work effort and utilizing shared inputs. The sharing arrangements often found

in group practice provide little incentive for cost control or increased productivity.

Evidence supporting the theory is considerable. First, physicians in solo practice spend more time on routine administrative activities, resulting in significantly higher costs per visit ($2.66 versus $1.91). If administrative costs incurred in solo practice could be reduced to those experienced in small groups, nearly $300 million could be saved per year. Second, administrative cost regressions show the efficient scale to be at approximately 6 physicians. This estimate, while seemingly low, is actually higher than many others found in the literature. We attribute this to the fact that for the first time sharing arrangements have been held constant. As predicted, practices composed of equal sharers exhibited a rising average administrative cost curve throughout the relevant range although costs remained below those of solo practitioners.

Third, perverse incentives can be offset by collective decision-making, either through meetings with partners or by delegation to an office manager. Group practices in which physicians were unconstrained in their purchase of inputs had administrative costs about 20 percent higher than the average for all groups.

Fourth, higher administrative costs were found in specialists' practices and in those operating in physician rich areas. For example, the addition of one physician per 1,000 population raises administrative costs by $.55 per visit, or 4 percent. Determining whether higher costs are justified requires an evaluation of patient outcomes with longer physician contacts. If they are not, then the legitimacy of using cost-based fee schedules with implicit interarea adjustments for lower volume is questionable.

Finally, physicians were found to differ systematically in their preferences for alternative practice modes. Physicians choosing group practice definitely were less interested in autonomy, sought more peer consultation, and wanted help with onerous personnel and other administrative tasks. This gives us the first solid evidence that physician preferences concerning crucial issues of resource management differ significantly between solo and group practice.

Medicaid Participation

For the first time, national estimates are available from this study on physician participation in state Medicaid programs. Slightly over 70 percent of all physicians interviewed said that they did see some Medicaid patients, but the distribution is quite skewed. (See Figure 1.) Nearly 30 percent of

our sample stated that less than one percent of their practice was Medicaid; only 5 percent of physicians reported more than half their practice Medicaid.

A general model of institutional price discrimination is used to explain physician participation. Physicians are assumed to order patients by their ability to pay, treating first those that can afford the most, then filling in the rest of their time with less wealthy patients. Public programs like Medicare and Medicaid encourage this process by establishing fee schedules fixed at predetermined percentages of usual and customary fees, thus institutionalizing price discrimination. Medicare, and particularly Medicaid, act as residual categories, absorbing private physician resources at the margin.

Our empirical findings, using Tobit analysis, were quite consistent with the theory (see Tables 1 and 2). Physicians responded strongly to economic incentives, particularly to policy manipulable variables such as Medicaid fees and the "red tape" burden. Where fee schedules were higher, physicians treated more Medicaid patients; holding other factors constant, the fee elasticity for Medicaid participation was .70. If the average Medicaid fee schedule doubled, the proportion of a physician's practice devoted to Medicaid patients would increase by 70 percent, or seven percentage points based on our mean of 10 percent.

Physicians willingness to participate is also explained in part by the administrative burden involved in obtaining reimbursement directly from the government. The "red tape" resulting from payment delays and informational requirements very definitely lowers participation in public programs. Assuming cost control is desirable, the marginal program dollar may be better spent on improving payment mechanics than on raising fees.

The cost of complementary inputs--primarily labor--was also found to influence participation as predicted; the estimated wage elasticity of Medicaid participation was -1.88. Physicians in high wage areas see fewer Medicaid patients, holding other factors constant, choosing to limit their practices to more affluent (or better insured) patients.

While economic variables clearly play a major role in physicians' decisions to participate, physician background and training also have policy significance. The Health Professions Education Assistance Act will seriously restrict the immigration of foreign medical graduates (FMG). Yet, we found that FMGs from third-world countries averaged 15 percent of their practice Medicaid compared to an overall mean of 10 percent,

again holding all other relevant factors constant. Our study shows that FMG participation in Medicaid is a full 50 percent higher than that of domestically-trained physicians. Offsetting this effect to some degree may be the Act's call for more family practitioners. Internists, for example, see only 70 percent as many Medicaid patients as GP's.

Reduced Fees/Bad Debts

The practice of price discrimination appears to continue not through an ex ante decision to reduce fees but rather by an ex post willingness to incur more bad debts. Physicians reported foregoing only 2.7 percent of gross income through reduced fees, but lost 8.4 percent through bad debts (see Table 3). Further examination showed that more physicians participating in public programs (Medicare assignment and Medicaid) had higher loss ratios than nonparticipants. If public policy competes with physicians as reallocators of medical services from the rich to the poor, then the competition is quite limited. The relatively high loss ratios of participating physicians from the cross-sectional data, when interpreted intertemporarily, suggest that significant unmet need is now being addressed that was never addressed before. It also suggests, and cross-tabulations of losses by physician net incomes corroborate it, that more public-spirited physicians are bearing a disproportionate burden of patients' inability to pay.

Finally, the evidence on physician bad debts suggests that direct billing of the government for public beneficiaries may be attractive--at least to some physicians. Thirty-five percent of physicians said they would be willing to discount their usual fees by an average of 2 percent in return for direct payment. These physicians were primarily those with more bad debts and consequently higher collection costs. The acceptable discount rate was found to be elastic with respect to reduced fees and bad debts, every one percent increase in the loss ratio raising the discount by 1.24 percent (see Table 4). Despite the generally small number of physicians willing to accept a discount for the privilege of direct billing (no doubt influenced by the administrative burden involved), hundreds of millions of dollars could be saved annually by even slight reductions in allowable fees. Greater savings may be possible if reimbursement procedures could be streamlined.

The appended tables are based on our oral presentation. The complete study is forthcoming from Lexington Books, Private Physicians and Public Programs (Sloan, Cromwell, and Mitchell).

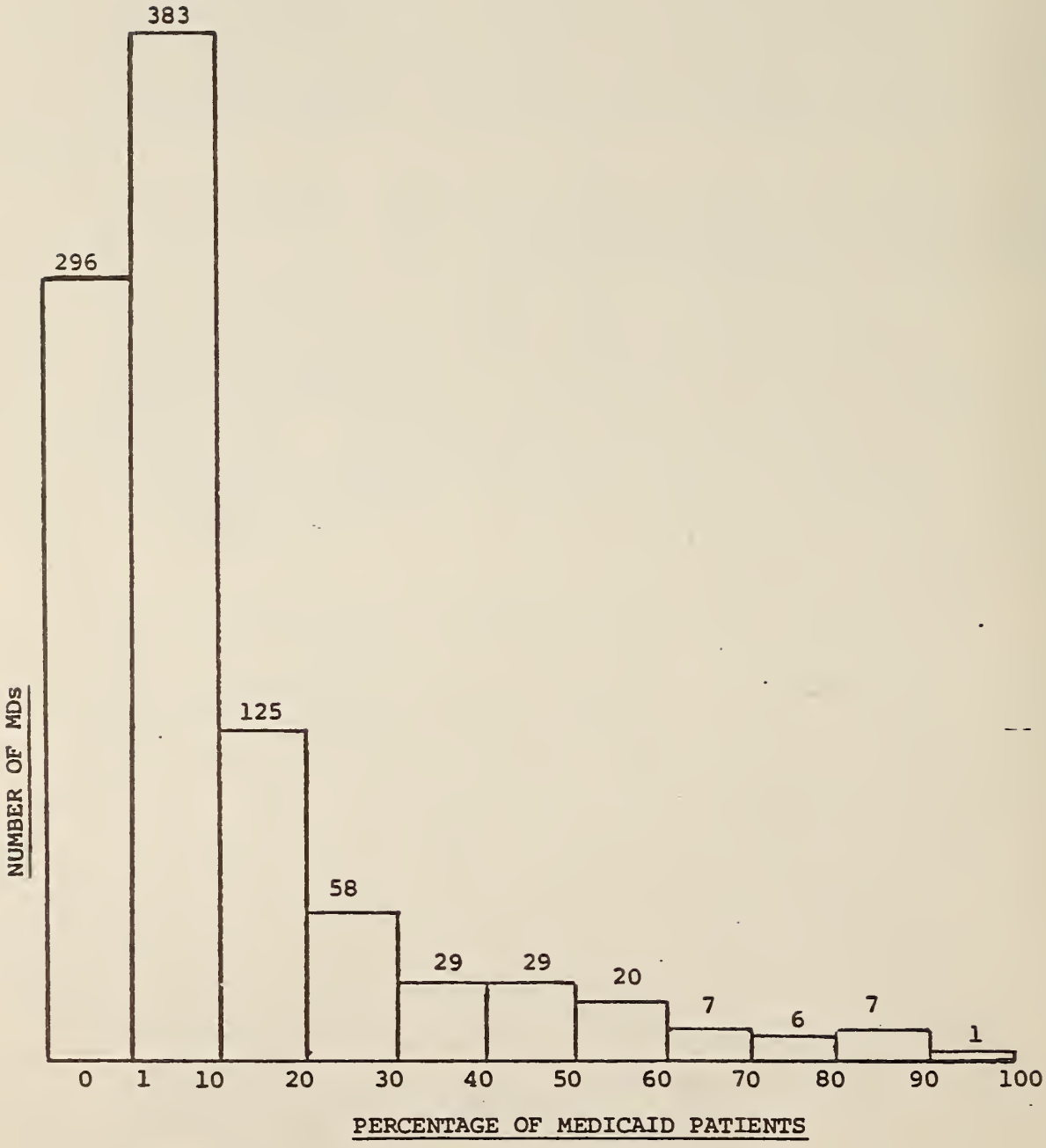


Figure 1: MEDICAID PARTICIPATION RATE

Table 1

MEDICAID PARTICIPATION REGRESSIONS

Variables	Regressions All (Tobit)	Regressions All (OLS)	Regressions Med. Spec. (Tobit)	Regressions Surg. Spec. (Tobit)	Means All	Means Medical Specialties	Means Surgical Specialtios
PART	-	-	-	-	10.34	9.39	11.46
MDP	1.57(3.80)*	1.16(3.82)*	0.74(1.37)	2.18(3.40)*	8.06	7.95	8.20
BSP	-1.00(-1.46)	-0.44(-0.86)	-0.37(0.43)	-1.88(-1.66)	11.28	11.10	11.48
MD1	-0.21(-2.60)*	-0.12(-0.67)	-0.10(-1.04)	-0.04(-2.88)*	19.56	19.95	19.09
MD2	-1.54(-2.21)**	-0.34(-0.66)	-1.08(-1.31)	-2.12(-1.66)	3.66	3.72	3.57
MD3	-0.52(-1.90)	-0.21(-1.03)	-0.69(-2.01)**	-2.73(-0.64)	8.72	8.87	8.54
Y	-0.0016(-1.13)	-0.0005(-0.52)	-0.005(-3.03)*	0.0003(1.62)	4635.18	4653.38	4614.66
MDPOP	-5.29(-1.96)**	-1.37(-0.67)	-6.04(-1.57)	-5.36(-1.39)	0.92	0.93	0.91
MCAID	0.58(4.27)*	0.41(4.07)*	0.42(2.49)**	0.83(3.65)*	10.83	10.24	11.53
BOARD	-0.02(-0.14)	-0.82(-0.64)	-2.20(-0.99)	2.04(-.74)	0.47	0.41	0.54
FAC	-1.23(-0.57)	-1.81(-1.13)	0.07(0.24)	-2.81(-0.82)	0.14	0.14	0.13
FMG	7.25(2.73)*	5.06(2.53)**	8.43(2.34)**	6.06(1.55)	0.08	0.07	0.08
IM	-4.79(2.32)**	-3.16(-2.08)**	-2.87(-1.23)	-(-)	0,22	0.41	-
PD	0.07(0.03)	0.28(0.14)	2.34(0.82)	-(-)	0.13	0.23	-
GS	-0.67(-0.29)	-0.09(-0.53)	-(-)	-3.38(-1.07)	0.17	-	0.37
OB	-3.60*-1.52)	-0.93(-0.54)	-(-)	-6.41(-2.02)**	0.17	-	0.36
WAGE	-7.96(-3.42)*	-2.91(-1.69)	-8.04(-2.66)*	-9.88(-2.74)*	4.03	4.00	4.05
PY	-0.75(-0.41)	0.007(0.005)	-0.50(-0.21)	-1.22(-0.42)	0.18	0.19	0.17
CHILD	1.69(0.70)	0.61(0.34)	3.41(1.23)	-2.06(-0.45)	0.03	0.04	0.02
A60	-7.93(-4.57)*	-4.59(-3.64)*	-9.21(-4.00)*	-5.77(-2.18)**	0.26	0.28	0.24
HL	2.45(1.19)	1.07(0.70)	4.88(1.84)	-1.58(-0.49)	0.13	0.13	0.13
EQ1	4.79(2.73)*	2.59(1.97)**	5.52(2.38)**	4.09(1.56)	0.22	0.21	0.23
EQ2	-0.87(-0.53)	-0.20(-0.16)	-3.29(-1.50)	2.61(1.04)	0.27	0.27	0.26
CONST	58.21(3.73)*	23.83(2.07)**	73.79(3.67)*	49.24(1.99)*	-	-	-
	σ = 19.66	R^2 = 0.12	σ = 18.70	σ = 20.14			
		R^2(C) = 0.09					
		F(22,934) = 5.53*					

Table 2

EFFECTS OF SELECTED EXPLANATORY VARIABLES ON MEDICAID PARTICIPATION[1]

VARIABLE	ELASTICITY		MARGINAL EFFECT[8]	
	TOBIT	OLS	TOBIT	OLS
MDP	0.76,0.66[2]	0.90	--	--
BSP	-0.39[3]	-0.48	--	--
MD1	-0.09[4]	-.023	--	--
MD2	-0.27[4]	-0.12	--	--
MD3	-0.06[4]	-0.18	--	--
Y	-0.40[5]	-0.23	--	--
MCAID	0.08[6]	0.43	--	--
FMG	--	--	4.43	5.06
IM	--	--	-2.76	-3.16
WAGE	-1.88	-1.13	--	--
A60	--	--	-1.59	-4.59
EQ1	--	--	3.00	2.59
EQ2	--	--	-0.51	-0.20

[1]Based on the pooled sample

[2]First and second elasticity calculated assuming schedule raised $1.00 above mean and alternatively, lowered $1.00.

[3]Elasticity calculation assumes schedule raised $1.00.

[4]In each case, the change is 1.0 below the mean.

[5]A decrease of $500 is assumed for this elasticity calculation.

[6]A decrease of 1.0 percent is assumed.

[7]A wage decrease of $0.10 is assumed.

[8]In all cases, comparison is with MD without this characteristic.

1) Poor - had larger FMG larger losses Ped,

Spent more on collection medicaid

no Substitution

Table 3

REDUCED FEES AND BAD DEBTS BY SPECIALTY AND URBAN/RURAL LOCATION

groups less important had bad debt

Specialty and Location	Reduced-Fees (Dollars)	Bad Debts (Dollars)	Total Columns 1&2 (Dollars)	Reduced Fees/Gross Income (Percentage)	Bad Debt/Gross Income (Percentage)	Total Columns' 4&5 (Percentage
	(1)	(2)	(3)	(4)	(5)	(6)
GP	$2006	$ 9006	$11012	2.9%	9.0%	11.9%
GS	2665	9681	12345	2.8	8.8	11.6
PD	2224	8609	10833	2.4	8.2	10.6
OB-GYN	2520	10748	13267	2.9	8.3	11.2
IM	2218	8318	10536	2.5	7.6	10.1
URBAN	2296	9100	11396	2.7	8.2	10.9
RURAL	2105	10276	12380	2.5	10.3	12.8
TOTAL	2279	9206	11485	2.7	8.4	11.1

KEY: GP = General Practitioner; GS = General Surgeon; PD = Pediatrician; OB-GYN = Obstetrician/Gynecologist; IM = Internal Medicine

SOURCE: Primary data collection, Abt Associates/NORC 1976 Survey of Physicians.

Table 4

EFFECTS OF SELECTED EXPLANATORY VARIABLES
ON PHYSICIANS WILLINGNESS TO TAKE A DISCOUNT

Variable	Elasticity		Marginal Effect	
	Tobit[1]	OLS	Tobit	OLS
RBTGR	1.24	1.20	-	-
ABCV	0.07	0.11	-	-
CON1	-	-	-0.08	0.15
CON2	-	-	2.00	3.13
EQ1	-	-	0.88	1.21
EQ2	-	-	-0.77	-0.87

[1] Elasticity calcuation assumes 0.10 increase in the independent variable above the mean.

Patterns of Physicians' Charges:

Implication for Policy

William Hsiao

Harvard University

1) Do follow: R.V.U.
2) Economic impact on fee schedule
3) G.P + S.P charge different

Prices charged by physicians have gained national attention over the past decade. Physician fees are a major factor in determining the total cost of medical services. The rapid rates of inflation in fees have resulted in a larger share of our Gross National Product being spent on physicians' services. More importantly, price is the key economic variable that may determine the supply of doctors and also may influence physicians in their choices of specialty and geographic locations.

Yet little is known about the actual patterns of physicians' fees. This question has received little attention in academic circles. Most empirical studies in health economics have examined the average fees and average rate of inflation in fees. While these aggregate measurements are adequate for econometric studies, they cannot provide answers to certain important public policy questions. Among those are: (1) Do physicians follow a relative value schedule? (2) What is the economic impact of paying physicians on a fee schedule? (3) Do general practitioners and specialists charge different fees for the same services?

Health Care Financing Administration is funding a study on the "Economics of the Physician Market" which is being conducted by my research group at Harvard University. As a part of our statistical analysis for this study, we are examining the patterns of fees charged by physicians. This micro-study gives us more complete knowledge about the economic aspects of physician services. Moreover, the analysis enables us to provide some empirical answers to the three policy questions stated above.

A brief description of our data base is given in Section I. Statistical profiles of fees charged by physicians are presented in Section II. The implications of our analysis for policy questions are presented in Section III.

Section I: Data Base

In any given year, more than one billion encounters take place between physicians and their patients. Each encounter, except under pre-paid group practice plans, results in a fee being charged for service rendered. The volume of the data is staggering. For our study, a sample of this price information is selected based on geographic area, urban and rural locations.

The actual charges made by physicians were obtained from insurance carriers for twenty-four states. These insurance carriers maintain the most comprehensive set of computer records of the fees charged in their state because either their insurance covered a majority of the people in that state or they were carriers for the Medicare program.

The data tapes include information about the procedure performed, where it is done, the specialty of the doctor, the fees charged, and the amount paid by the insurance carrier.

The twenty-four states that we have selected include all regions of the United States. Among the urban areas included in our sample are New York City, Chicago, Massachusetts, and Indiana. Among the rural areas included are Idaho, Vermont, Louisiana, Oregon, and New Mexico.

The claim records represent the services provided between January 1, 1971 and December 31, 1971. There is an important reason for select-

ing the 1971 data for our study. This is the latest period of data that is not affected by the severe disturbance in the marketplace created by the Economic Stabilization Act. Between 1972 and 1974, the rate of increase in physicians' fees was controlled by the government. After it was decontrolled in 1974, the rate of increase in fees accelerated. Also physicians change their fees more frequently. It is plausible the recent inflation in fees is the result of a market in a disequilibrium state. Therefore, the pattern of physicians' fees could be distorted. Meanwhile, we are interested in studying the patterns of fees when the market is relatively stable. Therefore the 1971 data are used.

Section II: Profile of Physicians' Fees

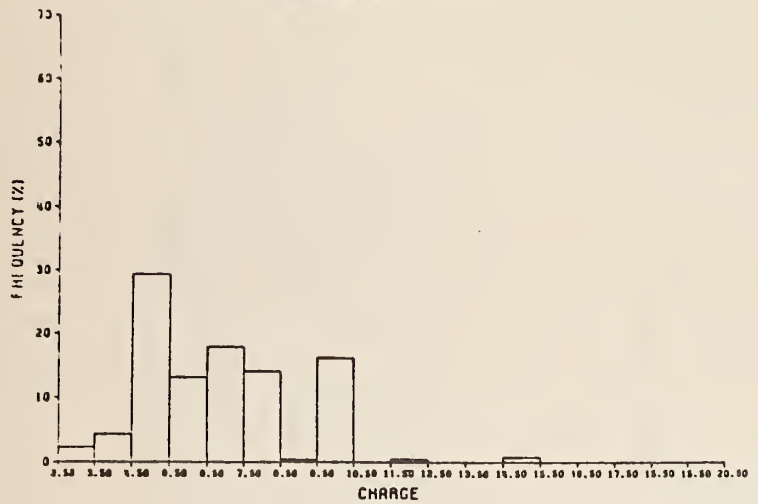
In a community (or a catchment area) fees vary widely for a given procedure. The range is greater for medical procedures than for surgical procedures. It is typical to observe a two- to threefold difference in charges among physicians for the most common medical procedure, a routine office visit. This is illustrated in Figures 1a and 1b for two states. The wide difference could be the lack of precision in the definition of medical procedures.

For surgical procedures, the variations in fees are less than for medical procedures. Typical distributions show less than a twofold difference. It is interesting to note that fees for normal delivery have a tighter distribution than other surgical procedures. This is shown in Figures 1c and 1d. Perhaps this is a result of search and price shopping by patients. The length of pregnancy gives time to mothers to search for the appropriate physician. For some patients, price may be

Figure 1

not normally distributed

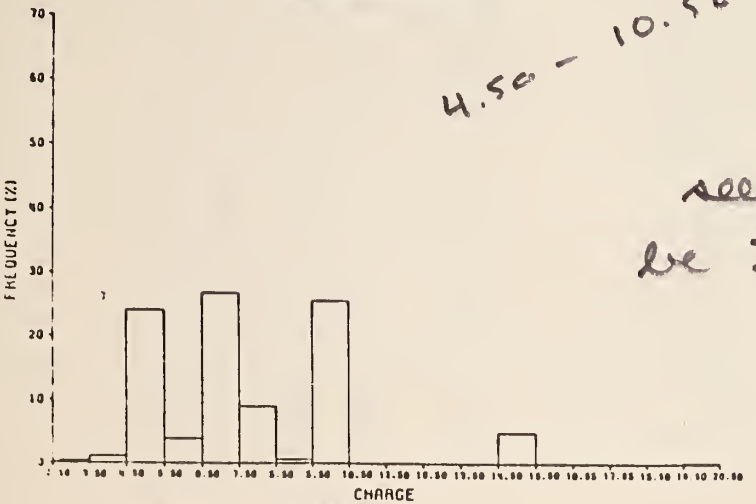
(1a)
ALABAMA
ROUTINE OFFICE VISIT



(1b)
MASSACHUSETTS
ROUTINE OFFICE VISIT

4.50 - 10.50

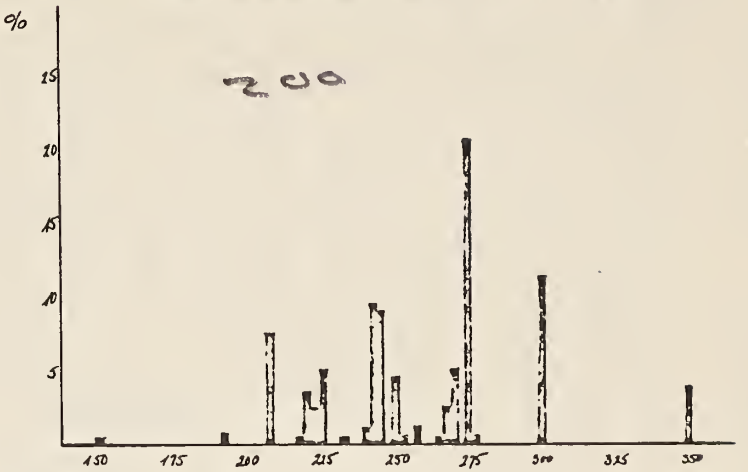
seems to be tri-modal



skew left

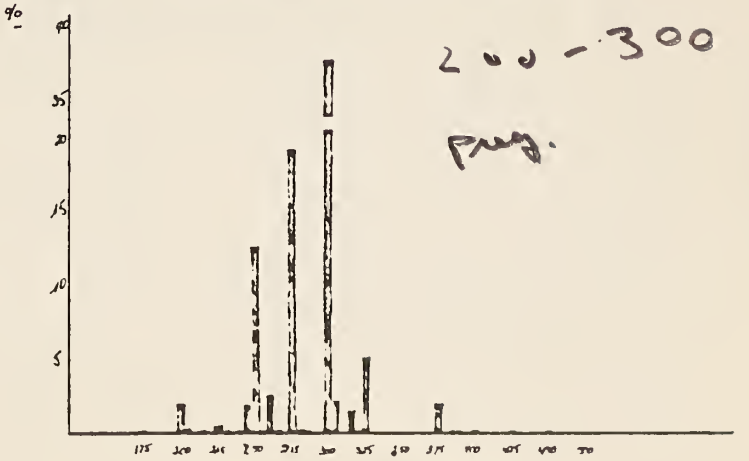
(1c)
ALAMEDA: HEMORRHOIDECTOMY, EXTERNAL, INTERNAL COMPLETE

200



(1d)
ALAMEDA DELIVERY, TOTAL OBST. CARE, INCLUDING VAGINAL DELIVERY

200 - 300 avg.



skewed right

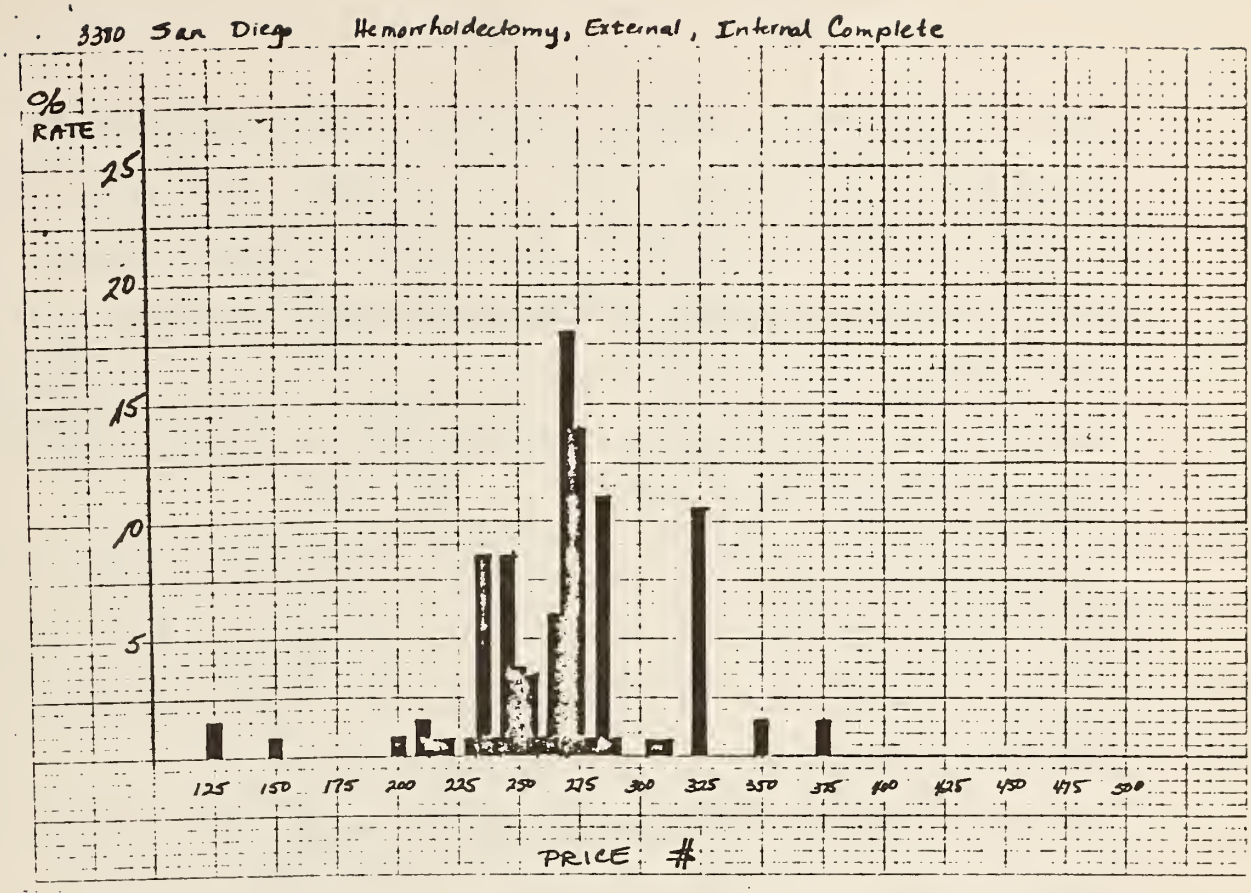
a factor in the selection of an obstetrician. This could impose some market discipline which results in narrower difference in fees. This market discipline could be further reinforced due to multiple pregnancies where mothers have repeated return visits. Meanwhile this consideration of repeated visits does not generally apply to other surgical procedures.

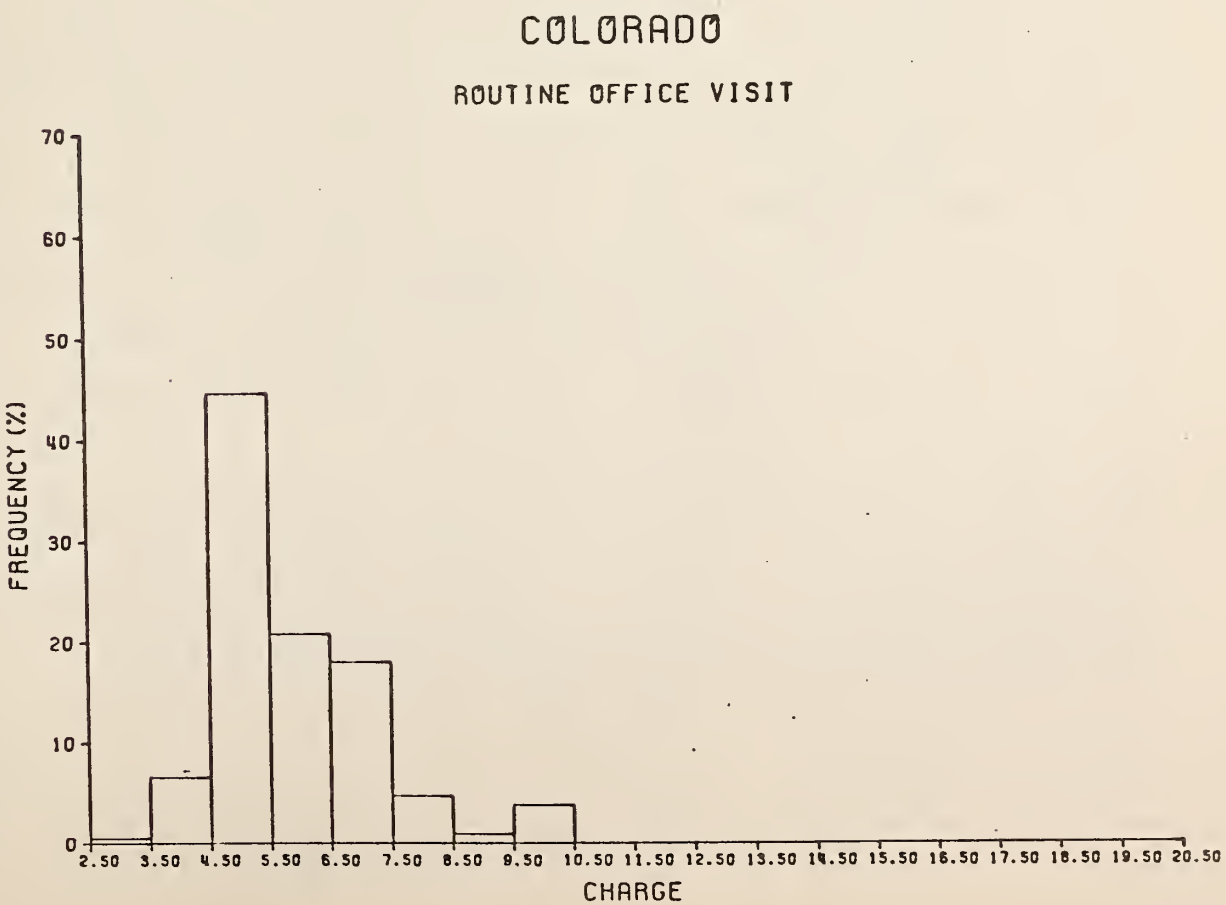
The dispersions of fees are not normally distributed. There is no statistical distribution that can provide a consistent representation of the dispersion of fees. For the surgical procedures, the distributions of fees in many states tend to be tri-modal, as shown in Figures 1c and 1d.

There is one significant difference in the distribution of fees between medical and surgical procedures. For the common medical procedures such as the routine office visit, the fees tend to be skewed to the left. In other words, more charges are concentrated in the lower price range and fewer doctors charge in the higher price range. Meanwhile, the opposite is true for surgical procedures. Surgical charges tend to be skewed to the right. A greater proportion of physicians is charging in higher price ranges. Figure 2 illustrates the difference in the skewness of the distributions between medical and surgical procedures.

Section III: Policy Implications

(A) In recent years, more attention has been paid to whether physicians set their fees in some collective manner. The Federal Trade Commission, among other government agencies, is investigating the promulgation of relative value schedules (RVS) by medical societies and Blue Shield plans. RVS can only influence the relative


3380 San Diego Hemorrhoidectomy, External, Internal Complete
% RATE
25
20
15
10
5
125 150 175 200 225 250 275 300 325 350 375 400 425 450 475 500
PRICE #


COLORADO
ROUTINE OFFICE VISIT
FREQUENCY (%)
70
60
50
40
30
20
10
0
2.50 3.50 4.50 5.50 6.50 7.50 8.50 9.50 10.50 11.50 12.50 13.50 14.50 15.50 16.50 17.50 18.50 19.50 20.50
CHARGE

price of various medical/surgical procedures. Individual physicians select their own conversion factors for a relative value unit and thus determine the absolute level of fees they charge. If one postulates there is price-fixing whereby the RVS is arbitrarily determined by a small group of doctors and they somehow can force most doctors to use it, then we can test the validity of this hypothesis by examining whether doctors are adhering to the RVS.

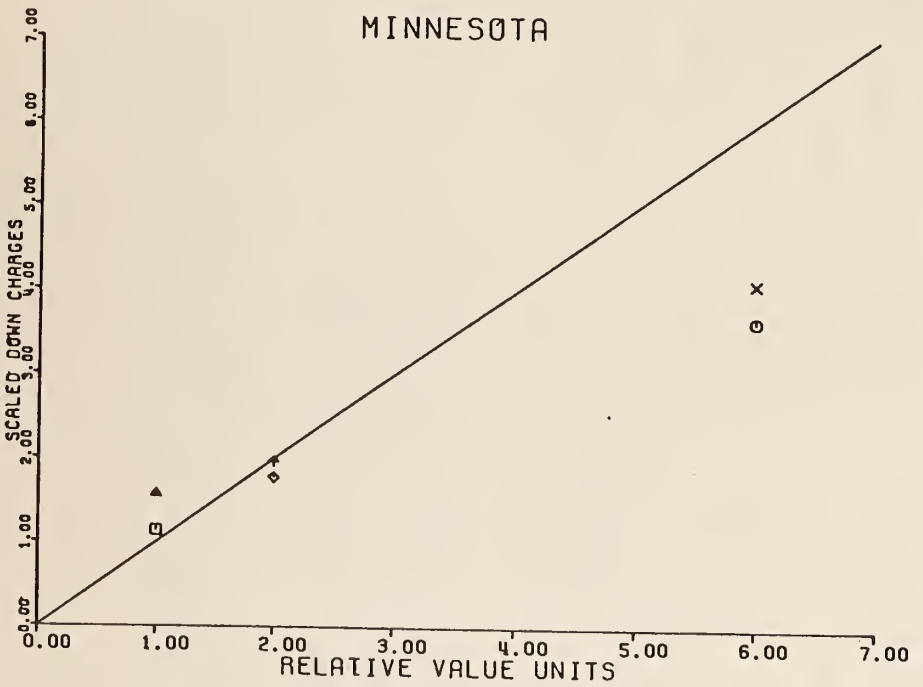
On the other hand, one can postulate (and indeed many claim it is the case with the California Relative Value Schedule) that RVS is derived from the actual prices charged by doctors. Therefore one would expect a close adherence to the RVS by the average doctor.

We used our mico-price data and statistically fitted to the RVS schedule that is promulgated by that state. The typical result is shown in Figure 3. In most states, the actual fees do not seem to follow the RVS. We used various statistical methods in fitting the actual fees to the RVS, and we obtained the same conclusion. Physicians do not charge consistently according to the RVS. Two preliminary conclusions can be drawn from this empirical finding. First, the RVS cannot be derived completely from actual market prices. Otherwise we would find a very close fit between the RVS and actual charges. Second, if organized medicine is trying to fix prices through RVS, it has not been able to do it effectively.

(B) One policy option to contain price inflation that has been mentioned frequently is reimbursing physicians based on a fee schedule. As shown in Section II of this discussion, physicians' fees are

Figure 3

RESISTANT FIT OF MEDICAL PROCEDURES TO CRVS

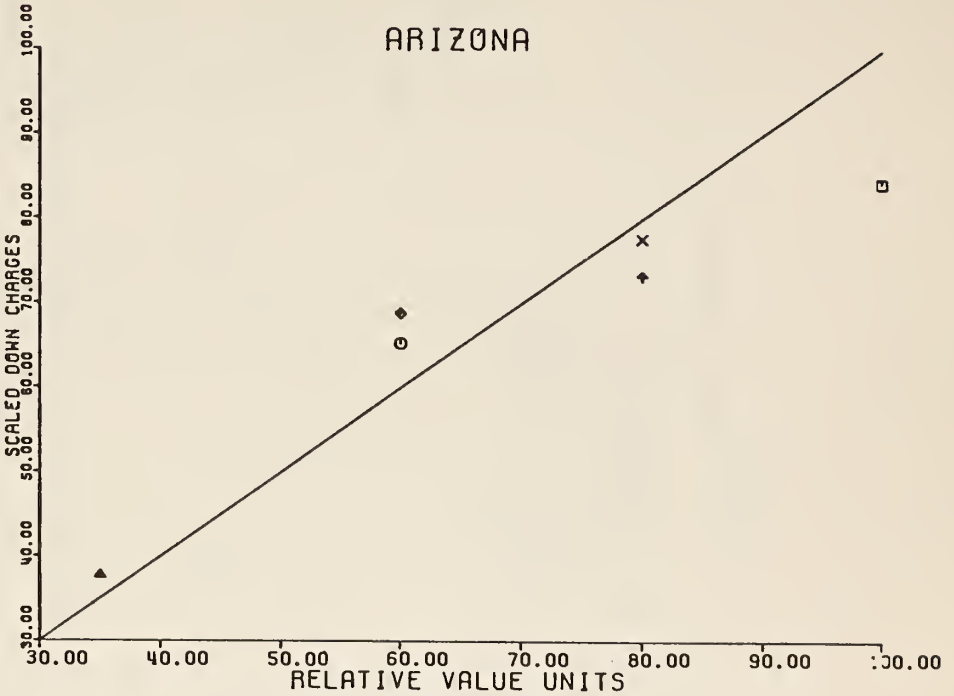


PROCEDURES

- ROUTINE OFEICE VISIT
- INITIAL OFFICE VISIT
- ROUTINE HOSPITAL VISIT
- INITIAL HOSPITAL VISIT
- ROUTINE HOME VISIT
- ROUTINE NURSING HOME VISIT

do not follow r.v.u Schedules

RESISTANT FIT OF SURGICAL PROCEDURES TO CRVS



PROCEDURES

- COLECTOMY
- CHOLECYSTECTOMY
- REPAIR OF INGUINAL HERNIA
- TRANSURETHRAL RESECTION OF PROSTATE
- TOTAL HYSTERECTOMY
- EXTRACTION OF LENS

dispersed over a wide range. If a fee schedule approach is followed, the reimbursable amount for each procedure is likely to be established at such a level that would be acceptable to the vast majority of physicians. We selected two hypothetical levels--the average fees and the seventy-fifth percentile--to analyze the economic impacts of a policy using fee schedules. When a fee schedule is established, those physicians who are currently charging lower prices will be paid more.

Meanwhile, those physicians who charge more than the fee schedule will receive less than their charges. However, if these doctors are allowed to bill patients for the difference between their charges and the fee schedule, a part of the financial burden would be passed on to the patients. If we do not allow doctors to bill patients for the difference, we can expect a change in billing practices such as fragmentation of services and a shift in the designation of services performed.

Table 1 compares the budget outlay for reimbursing doctors according to their charges and pay physicians according to a fee schedule at the 50th percentile and the 75th percentile. The numbers shown in Table 1 show the percentage of increase or decrease in total payment between a fee schedule reimbursement scheme and paying actual charges.

For a medical procedure, the routine office visit, a fee schedule established at the 50th percentile will reduce budget outlays. If the fee schedule is set at the 75th percentile, there would be increases between 5%-25% in total payments, varying between states. The surgical

Table 1

Percent of Charge Over Actual Charge

State	Medical Procedure*		Surgical Procedure*	
	50th	75th	50th	75th
1) Alabama	-4	19	-4	8
2) Arizona	-5	16	0	9
3) Colorado	-6	15	4	4
4) Idaho	0	8	-4	8
5) Illinois	-3	14	4	13
6) Indiana	-1	9	0	13
7) Kansas	-6	21	-9	3
8) Louisiana	8	8	-5	6
9) Massachusetts	-7	26	-8	15
10) Minnesota	-10	6	-5	6
11) Mississippi	-11	6	4	4
12) Nevada	-3	11	-3	5
13) New Hampshire	-6	-	2	2
14) New Mexico	5	12	0	0
15) New York	-17	11	-12	19
16) North Carolina	-6	10	-10	12
17) Oklahoma	-12	5	-6	6
18) Oregon	-3	4	1	1
19) South Dakota	-4	11	-3	11
20) Tennessee	-9	6	-4	8
21) Texas	-20	13	-10	13
22) Vermont	-10	13	5	5
23) Virginia	-9	17	-1	12
24) Wyoming	2	11	9	9

*Medical procedure represented by routine office visit and surgical procedure represented by repair of inguinal hernia.

procedure, hernia repair, shows less reduction at the 50th percentile and larger increases if the fee schedule is set at the 75th percentile.

(C) An unresolved controversy in physician reimbursement policy is whether there should be a different fee paid to general practitioners versus specialists for performing the same procedure. On one hand, specialists require longer training, therefore it is argued that they should be paid more for performing the same service. On the other hand, it is argued that if a given procedure can be performed equally well by G.P.'s, then they should be paid the same price (under the circumstance that if G.P.'s are not qualified to perform a given procedure, then they should not be allowed to do it).

Market prices may provide some information which can be useful in resolving this policy question. We tabulated these charges for various procedures by specialty. The results are shown in Table 2. In almost every state, there is no significnat difference in the fees charged by G.P.'s and general surgeons for routine office visits. However, for surgical operations, G.P.'s consistently charged less than surgeons. On average, G.P.'s charge 10 to 20 percent less.

10-20% higher

TABLE 2

COMPARISON OF FEES BY SPECIALTY

State	Routine Office Visit		Inguinal Hernia	
	General Practice	General Surgery	General Practice	General Surgery
Alabama	$5.51 (1.48)	$5.60 (1.76)	$193 (52.77)	$214 (50.30)
Arizona	7.35 (1.04)	7.56 (1.44)	233 (33.23)	255 (31.18)
Colorado	5.36 (0.81)	5.36 (1.01)		
Idaho	6.04 (0.89)	6.33 (1.25)	189 (28.75)	223 (49.81)
Illinois	7.15 (2.30)	8.00 (2.71)	272 (75.79)	293 (75.23)
Indiana	6.46 (1.95)	5.67 (1.59)	186 (56.30)	204 (42.50)
Louisiana	5.62 (1.14)	5.88 (1.21)	209 (54.92)	243 (66.88)
Minnesota	6.23 (2.88)	5.97 (1.11)	190 (37.11)	214 (48.26)
Mississippi	5.29 (1.59)	5.26 (0.95)	188 (45.21)	193 (50.82)
Nevada	7.94 (1.46)	8.07 (1.30)	289 (46.44)	316 (27.57)
New Hampshire	7.30 (4.23)	6.72 (3.11)		
New Mexico	5.92 (1.26)	6.67 (1.15)	207 (48.31)	230 (39.28)

TABLE 2--Continued

State	Routine Office Visit		Inguinal Hernia	
	General Practice	General Surgery	General Practice	General Surgery
North Carolina	$5.24 (0.76)	$6.33 (1.60)	$187 (58.82)	$224 (61.33)
Oklahoma	5.35 (0.71)	5.68 (1.00)	190 (33.88)	224 (42.41)
Oregon	6.47 (0.76)	6.79 (0.77)	213 (11.18)	217 (52.32)
Tennessee	5.11 (1.19)	5.79 (1.82)	184 (42.19)	213 (46.12)
Texas	5.68 (1.46)	5.21 (1.07)	197 (60.89)	233 (67.14)
Vermont	6.09 (2.58)	5.76 (2.20)		
Virginia	6.04 (1.40)	5.73 (1.27)	159 (88.07)	203 (52.27)
Wyoming	5.47 (1.39)	5.34 (1.28)	173 (33.50)	193 (37.56)

THE EFFECT OF MEDICARE/MEDICAID REIMBURSEMENT ON PHYSICIAN BEHAVIOR: A SUMMARY OF FINDINGS

by

John Holahan, William Scanlon, Jack Hadley, and Robert Lee

The Urban Institute will present the results from three parts of its study of physician pricing. The objectives of those tasks were to:

- Analyze differences between charges made on non-assinged and assigned claims to Medicare and between Medicare and Medicaid charges for similar procedures; differences between total and "optional" assignment rates; and changes in the ratios of billed to reasonable charges in Medicare and Medicaid.

- Analyze changes in indices of fees, service complexity, service volume and revenues in Medicare over the period 1972-1975, and determine if there were differences in prices and patterns of service delivery between the price control (1973, 1974) and non-control (1975) years.

- Develop and estimate an econometric model which explains physicians' price and output decisions, with particular emphasis on the effects of private fees Medicare and Medicaid reasonable charge screens on services provided on an assignment basis in Medicare and to Medicaid patients.

The data consist of all claims made to Medicare and Medicaid programs during the last quarter of the fiscal year in each of four years (1972-1975) by a sample of 5,000 physicians in the state of California. The physicians in the sample were drawn from eleven specialties and were distributed geographically across the state. There were 1,396 general practitioners, 786 general surgeons and 942 internists and most of the findings reported here are based on analyses of those physicians. Because we were interested in examining changes in services over time, it was important to eliminate physicians whose service patterns would be interrupted by changes in location or practice mode. Therefore, all sample physicians were in the same practice location during each of the four years. Furthermore, the sample was limited to solo-practitioners because it was not possible to identify billings of individuals within a group. The claims record allowed us to identify the date of service, procedure code, the patient ID number, the actual charge and the amount paid for each procedure.

Two other files containing data on the physicians' usual and customary charges were attached to the physician's record for each claim.

Findings

(1) Analysis of Charge Differentials

Examination of twenty-five of the most frequently performed procedures for 1975 revealed that billed charges on non-assigned Medicare claims were, on average, roughly five percent larger than on assigned Medicare claims and seven percent larger than on Medicaid claims. Further analysis revealed that physicians bill virtually the same amount to each program; differences in average charges among programs were thus due to differences in the composition of physicians. The data indicated that assignment rates (percentage of claims assigned) in Medicare were 60 percent for general practitioners, 56 percent for general surgeons and 40 percent for internists, somewhat comparable to those usually cited in other surveys. However, after eliminating joint Medicare-Medicaid claims, for which the physician must accept assignment, assignment rates fell to 33 percent for general practitioners, 37 percent for general surgeons, and 22 percent for internists. This would indicate that physicians are much less willing to accept assignment than is commonly assumed and that policies to increase voluntary assignment may face significant resistance.

We examined the ratio of actual to allowed charges and found remarkable growth in that ratio over the four years. (During this period, the Economic Stabilization Program imposed controls on the growth of Medicare reasonable charges and the California Medicaid program permitted Medicaid reasonable fees to increase by only 2.5 percent in 1973.) In 1972, actual

charges exceeded allowed amounts by approximately eleven percent on assigned claims and by twelve percent on non-assigned claims. By 1975 actual charges exceeded allowed amounts by roughly 26.5 percent for both assigned and non-assigned claims. In Medicaid actual charges exceeded allowed amounts by 15.0 to 27.6 percent in 1972, depending on specialty. By 1975, actual charges were 30 to 47 percent in excess of allowed amounts.

(2) Analysis of Fess, Service Complexity, Service Volume and Revenues in Medicare During the Economic Stabilization Program

The Economic Stabilization Program imposed controls on physician fees from August 1971 through the end of April 1974. ESP's objective was to constrain the growth in allowed charges in 1973 and 1974 to 2.5 percent per year. In 1975 controls were removed and reimbursement rates were permitted to increase.

The study first examined the change in actual and reasonable charges during and after the control period. Table I provides price indices developed for both actual and reasonable charges for the four year period. The price indices using base year service weights show that actual charges rose slighly faster than controls required in 1973, significantly more rapidly in 1974 and jumped very sharply in 1975 for all three specialties. Reasonable charges, which are controlled directly by the Medicare intermediary, were held well within targeted limits for both assigned and non-assigned claims in 1973 and 1974. Reasonable charges increased significantly between 1974 and 1975.

The second half of Table I shows price indices based on current year service weights. In each year, both actual reasonable and actual charges increased faster than the corresponding base year service weights index.

The difference between the two sets of indices appears to be due primarily to the increasing service complexity. Other results showed that fee inflation through use of the procedure coding terminology system occurred throughout the four year period--it did not appear to be related to the price control years.

We next examined changes in the volume of services. The results (Table II) demonstrate that physicians expanded the volume of se-vices provided to Medicare during the control years. For each of the three specialties, the total volume of services rose by roughly ten percent in the first and second price control years. Medicare enrollment increased by only 2.5 percent in each year. In 1975 after controls were removed, service volume rose only slightly for general surgeons (1.3 percent) and internists (2.5 percent), and fell markedly for general practitioners (-8.0 perdent). The small changes in services in 1975 occurred despite a 2.6 percent increase in Medicare enrollment.

The net result is that gross Medicare payments to our sample physicians increased more during the two price control years than in the year after. Between 1972 and 1973 gross Medicare revenues of general practitioners, general surgeons and internists increased by 11.9, 10.1, and 12.0 percent, respectively. In the second year of controls, gross revenues increased by 12.4, 15.6, and 19.3 percent, respectively. During the first year after controls, incomes grew by 3.6 percent for general practitioners, 9.1 percent for general surgeons and 12.3 percent for internists. The main impetus in the first two years was the increase in services and in the last, the sharp rise in charges.

We have no data on services provided by the sample physicians in the private market. Thus, we do not know if we have observed a substitution of Medicare for private patients or a general increase in services. Finally, many other changes affected the medical marketplace during these years, e.g., increases in the unemployment rate, the number of malpractice claims, and the supply of physicians. Thus, the fluctuations we have observed cannot be attributed solely to the price controls.

(3) Econometric Analysis of Physician Pricing and Output Decisions

a) Price Functions

Our model of physician pricing behavior combined theories of multi-market pricing to derive a number of hypotheses. A quick sketch of some of these will be helpful in interpreting our results. First, our model of multi-market pricing suggested

1) that raising reasonable fees would cause some physicians to raise their privat charges;

2) that physicians who voluntarily treat Medicaid patients would tend to have lower prices in the first place.

The first proposition was not directly testable, primarily because the method of computing reasonable fees would alone be sufficient to find a strong statistical relationship between reasonable fees and billed prices. Thus, the coefficients of the Medicare and Medicaid fees reported in Table III probably overstate the increase in private charges which would follow a rise in reasonable fees.

The second proposition was tested by looking at Medicaid participants and non-participants separately in our price equations. As predicted, participants and non-participants has significantly different coefficients, thus supporting our multi-market model. Our second hypotheses deals with the impact of price controls. If price controls were effective, one would expect prices to rise quickly when controls were relaxed. Since 1975 was the first unambiguous non-control year in our sample, we included 1975 interaction terms to see if such a price rise could be detected. Our results confirm a substantial rise and are consistent with the hypotheses that price controls did restrain billed prices per CRVS unit, not just reasonables.

Our model of multi-period pricing attempted to summarize the nature of Medicare's method of determining reasonable fees. It suggested that if physicians expect reasonable fees to grow at a rate slower than overall inflation, they might respond by increasing billed prices to ensure that reasonables would be high later. We tested this hypothesis by including the lagged rate of growth of Medicare reasonables, DR, in our equations. The significant negative sign for DR supports the notion that basing reasonables on past billings did contribute to inflation. This conclusion suggests the value of moving to a policy like the Economic Index as a mechanism for adjusting reasonable fees.

Finally, a number of personal and community variables were included in the equations to measure cost and demand conditions in local markets. For the most part, these variables were not significant determinants of billed prices, though it appears that large numbers of physicians per capita does exert downward pressure on prices. However, we believe the general

insignificance of these variables is due to the fact that the Medicare and Medicaid reasonable fees capture most of the interphysician variation in costs and private demand levels.

We present separate equations for each of the three specialties in our sample: General Practice, General Surgery, and Internal Medicine. As might be expected, there are differences in size and significance of coefficients between specialties. Even so, none of the estimates directly contradict theoretical expectations.

In general, the price equations are consistent with theoretical predictions. Moreover, the equations exceeded expectations in terms of goodness of fit. They provide a good base for analysis of Medicare assignment and Medicaid supply decisions.

b) Statistical Supply Functions

The estimation of statistical supply functions for Medicaid and Medicare assignment services is motivated by three questions.

1. Is the supply of office-based physicians' financed, fixed fee programs sensitive to variations in fee levels?

2. How would the availability of such services be affected by changes in Medicare and Medicaid reimbursement and what are the implications for cost containment?

3. What was the impact of the ESP on the supply of services to Medicaid and Medicare assignment patients?

In general, the physician's supply decision has two components: first, whether to participate in the program, i.e., to treat a meaningful number of Medicaid or Medicare assignment patients; and second, how many services to supply, given that the physician "participates" in the fixed fee program. This analysis focuses on the latter decision.

Specification of the estimating equations was based on the simple theory of the price discriminating firm. The theory suggested that the basic sample be partitioned in order to identify marginal suppliers in each of the two programs. Econometric considerations led us to choose a linear, logarithmic functional form which was estimated over a pooled sample of northern California general practitioners, internists, and general surgeons. The coefficients of the price variables were allowed to vary across specialties. Finally, two versions of each supply function were estimated: one constructs the price variable as the difference between the billed charge and the program (Medicaid or Medicare assignment) reasonable fee, and the other enters the billed charge and the reasonable as separate variables.

Our theory predicted that the billed charge should have a negative coefficient, the program reasonable a positive coefficient, and the difference between them a negative coefficient. Preliminary parameter estimates (Table IV) indicate that the results are generally consistent with these hypotheses. All estimates have the correct signs and are statistically significant, except for the program fee coefficients in the separate price variable specification. There is reason to believe, however, that these estimates may be unreliable on econometric grounds. The coefficients of the billed charge variables are generally large in magnitude and remarkably stable across specifications and programs.

Our second question, which inquires about the implications of changes in program reasonables on the availability of services and total costs, can be best addressed with the aid of a simple policy simulation. Using parameter estimates from both the supply and price functions, we calculated the effects on the quantity of Medicaid services of increasing the Medicaid

and Medicare reasonables per CRVS unit to the levels of the billed charges per CRVS unit in each specialty. Table V gives the results of this exercise, first under the assumption that billed charges are constrained at current levels, and then assuming that they increase as predicted by our price equation. Although one should not take the specific numerical estimates too literally, the important policy implications come from comparing total program expenditures, total additional patient loads, and total costs per additional patient under the two assumptions. Note that these calculations ignore potential changes in either the Medicare or private markets, and that we do not consider changes in participation rates.

Our third question concerned the impact of price controls on the supplies of services. In general, one might expect price controls to have two types of effects. First, the parameters of the supply function might change if physicians alter their underlying behavior, i.e., the shape and position of the entire function might shift. Second, price controls affect the values of key variable, the billed price and the Medicare reasonable. This clearly will also influence physicians' supply decisions.

So far, we have rejected the hypothesis that the coefficients of the price variables were different in the control and non-control years for three of the four supply function specifications. In the current phase of our analysis, we are simulating what billed prices and Medicare reasonables would have been in the absence of price controls, and then using the estimated supply functions to predict what Medicaid and Medicare assignment supply would have been without price controls. Results should be available shortly.

TABLE I

Changes in Medicare Actual and Reasonable Charges (Per Service)

All Services

1972 Service Weights

		Mean Charge	Indices		
		1972	1973	1974	1975
General Practitioners	Actual	8.80	1.029	1.094	1.229
	Reasonable	8.07	1.011	1.024	1.098
General Surgeons	Actual	14.99	1.027	1.092	1.225
	Reasonable	13.70	1.011	1.032	1.089
Internists	Actual	12.62	1.043	1.114	1.239
	Reasonable	11.57	1.017	1.042	1.107

Current Year Service Weights

		1972	1973	1974	1975
General Practitioners	Actual	8.80	1.057	1.130	1.320
	Reasonable	8.07	1.041	1.061	1.196
General Surgeons	Actual	14.99	1.072	1.139	1.315
	Reasonable	13.70	1.058	1.080	1.182
Internists	Actual	12.88	1.040	1.119	1.264
	Reasonable	11.57	1.033	1.067	1.158

TABLE III

Reduced Form Price Equations

Dependent Variable = Billed Charge Per CRVS Unit

(Standard errors in parentheses)

	General Practice	Internal Medicine	General Surgery
Constant	0.0163	-0.0137	0.0060
R (Medicare reasonable)[1]	0.8388*** [0.0402]	0.9581*** [0.0530]	0.8604*** [0.0481]
Medicare reasonable X 1975 Dummy	0.3682*** [0.0576]	0.1239*** [0.0731]	0.3907*** [0.0792]
DR (rate of change of the Medicare reasonable)	-0.0968*** [0.0195]	-0.0598 [0.0344]	-0.0427** [0.0162]
F (Medicaid reasonable)[2]			
Participants	0.7400*** [0.0645]	0.3940*** [0.0787]	0.7299*** [0.0587]
Participants X 1975 Dummy	-0.3016*** [0.0651]	-0.0325 [0.0829]	-0.3542*** [0.0918]
Non-Participants	0.3824*** [0.0587]	0.2175*** [0.0702]	0.5594*** [0.0854]
Non-Participants X 1975 Dummy	-0.2981*** [0.0658]	-0.0475 [0.0844]	-0.3683*** [0.0928]
MCD (Medicare participants intercept)	-0.2108*** [0.0390]	-0.0968* [0.0466]	-0.1153** [0.0485]
FMG (foreign medical graduate)	-0.0044 [0.0072]	0.0193** [0.0075]	-0.0105 [0.0117]
EXP (experience)	0.0017 [0.0010]	0.0018 [0.0010]	-0.0044*** [0.0012]
EXPSQ (experience squared)	-0.3630D-4 [0.2D-4]	-0.4252D-4* [0.2D-4]	0.6277D-4*** [0.2D-4]
MPRM (malpractice premium)	0.5716D-3*** [0.17D-3]	-0.2627D-3 [0.0002]	-0.1604D-3 [0.0002]
OWNMDS (own specialty per capita)	-0.0918*** [0.0242]	0.0780 [0.0549]	-0.0247 [0.0561]
OTHMDS (other physicians per capita)	-0.0152*** [0.0033]	-0.0218 [0.0193]	-0.0255 [0.03062
R - Squared	0.6965	0.6932	0.6914
SEE	0.0765	0.0623	0.0722
F	222.1277	138.1327	121.3167
D.F	14,1355	14,856	14,758

Notes: 1. Use of a price-year interaction term (Medicare reasonable X 1975 dummy) permits the Medicare reasonable to have a different coefficient in 1975. This is computed by adding the two Medicare reasonable coefficients.

2. Separate coefficients are presented for Medicaid participating and non-participating physicians. Changes in the coefficients for 1975 are computed by adding the 1975 interaction term to the preceeding coefficient.

* Significant at the 0.05 level
** Significant at the 0.01 level
*** Significant at the 0.001 level

1)
2) how availability effected by changes in services
3) Impact of stabilizing

TABLE IV

Structural Supply Functions - Preliminary Estimates

Dependent Variable - Natural Log of Quantity of Services Supplied[1]

Variables	Medicaid		Medicare Assignment	
	1	2	3	4
lnP - lnF, lnR[2] (log billed-log reasonable)				
GP	-.706**		-.608**	
IM	-.667**		-.689**	
GS	-.706**		-.678**	
lnP (log billed)[2]				
GP		-.704**		-.835**
IM		-1.312**		-.835**
GS		-.704**		-.835**
lnF, lnR (log reasonable)[2]				
GP		.0170		.313
IM		.692**		.051
GS		.0170		.313
EXP (MD experience)	-.00755**	-.00935**	-.00109	-.00177
FMG (foreign med. grad.)	.0695	.110	.0673	.0648
WAGE (average office salary)	.0246	.0558*	.141**	.137**
SIZE (county population)	-.000185**	-.00026**	-.0000396	-.0000641
MPRM (malpractice prem.)	.00454**	.00477**	.00493**	.00622**
OWNMDS (own specialists per eligible)	-.0473**	-.0764**	-.0502*	-.0340
OTHMDS (other specialits per eligible)	-.0164**	-.0138**	-.00315	-.00724
BDPC (beds per thousand)	-.0303**	-.0326**	.0154	.0113
CONSTANT	8.304	7.946	6.912	6.709
Degrees of Freedom	2688	2686	1261	1261
F	21.734	20.428	9.110	7.303
R^2 adjusted	.071	.080	.066	.052

Notes: 1. Output is measured in CRVS units.
2. The billed charge (P), the Medicaid reasonable fee (F), and the Medicare reasonable fee (R) are measured in dollars per CRVS unit.

* Statistically significant at five percent confidence level
** Statistically significant at one percent donfidence level

TABLE V

The Impact on Medicaid Supply of Equalizing
Medicaid, Medicare, and Private Fees
(Conservative Elasticity Estimates)[1]

A. Private Fees Held Fixed

		SPECIALTY			
		GP	IM	GS	TOTAL
1.	Average private charge[4]	.69	.67	.67	
2.	Average Medicaid reasonable fee[4]	.54	.52	.51	
3.	Medicaid fee elasticity[2]	.706	.667	.706	
4.	Private charge elasticity[2]	-.706	-.667	-.706	
5a.	Additional CRVS units per MD	448.87	516.73	608.75	
6a.	Total additional CRVS units[3]	568,265.87	414,414.82	301,330.61	
7a.	Total additional payments (Medicaid)	$505,820	$385,762	$265,698	$1,157,280
8.	Average CRVS units per patient	64	75	104	
9a.	Total additional patients	8,879	5,256	2,897	17,032
10a.	Average cost per additional patient	$56.97	$73.39	$91.71	$67.95

B. Private Fees Unconstrained

		SPECIALTY			
		GP	IM	GS	TOTAL
5b.	Additional CRVS units per MD	278.72	332.09	409.06	
6b.	Total additional CRVS units	352,857	266,338	202,486	
7b.	Total additional payments (Medicaid)	$473,509	$363,550	$249,883	$1,097,957
9b.	Total additional patients	5,513	3,551	1,947	11,011
10b.	Average cost per additional patient	$85.89	$102.38	$128.34	$99.71

Ratio of 7b to 7a	.949
Ratio of 9b to 9a	.646
Ratio of 10b to 10a	1.467

Notes:
1. For Medicaid Participating Physicians
2. From Table IV, Column 1
3. Total refers to northern California counties from which physician sample was drawn; estimates are adjusted for Medicaid participation rates
4. Dollars per CRVS unit

CANADIAN PHYSICIANS' SUPPLY RESPONSE TO UNIVERSAL HEALTH INSURANCE: THE FIRST FIVE YEARS IN QUEBEC

(Preliminary Results)

by

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Barbara Kehrer, Larry Manheim, Uwe Reinhardt

This summary was prepared for the Conference on Research Findings on Physician Reimbursement and the Market for Physician Services, to be held at the Washington, D.C. Hilton on February 21st and 22nd, 1978.

These results are preliminary. The final report of this project has not been submitted. Subsequently, the results may not be quoted or cited without written permission of the authors.

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February 9, 1978

A. RESEARCH OBJECTIVES

In general terms, the objective of this study has been to explore how physicians and their patients have fared under universal health insurance coverage introduced in November 1970 in the Canadian province of Quebec.

In pursuit of this goal, we analyzed the locational choices of physicians in the province, the organization of private medical practices, and the utilization of physician services by empirically interesting subsets of the Quebec population. Our research efforts have employed both time-series and cross-section analyses. The objective of the time series analysis was to trace the longer run impact of universal health insurance coverage on the level and composition of physician output and on the utilization of physician services by beneficiaries. Data for these analyses cover the period from January 1971 (soon after the onset of universal coverage) to December 1975. The unit of analysis in these studies is either the "representative physician" or the "representative beneficiary," with the "representative individual" being characterized by market area or time period averages of pertinent variables.

B. DESCRIPTION OF THE DATA

The analyses of this project were based on several data sources:

1. Regie de l'assurance maladie du Quebec (Regie)

The universal health insurance plan in Quebec is basically a fee-for service system with a fixed fee schedule negotiated by the provincial government and the two professional organizations representing general practice and specialist physicians, respectively. In the operation of the plan, a record is generated for each service delivered by physicians.

The basic data files for this project are based on samples of the approximately 180 million medical services delivered between 1971 and 1975. The samples were designed to produce two types of records, one in which the unit of analysis is the physician and the second in which the unit of analysis is the beneficiary. The samples were stratified by year (1971-1975) and location (the province was divided into 65 market areas). In addition, the beneficiary sample was stratified by family income (chronic low income as indicated by welfare status and not low income) and age and sex (five reasonably narrow separate age-sex groups).

2. Primary Data from a Telephone Survey of General Practice Physicians

A telephone survey of approximately 2,000 of the province's general practice physicians was conducted in the spring of 1977. The survey collected data on the general organization of the physician's office, visit rates, inputs of physician and non-physician time, as well as measures of queues to appointments. Confidentiality restrictions precluded merging telephone survey data with physician profile data maintained by the Regie.

C. SUMMARY OF MAJOR FINDINGS

1. The Distribution of Physicians

During the period 1971-75, the ratio of active physicians to population in Quebec increased at an average annual compound rate of 7 percent, more than seven times the comparable growth rate in the United States. Graduations from Quebec medical schools contributed 45 percent of this growth. About 23 percent was contributed by the inflow of foreign-trained medical graduates, another 24 percent by Quebec-trained physicians hitherto not active in direct patient care, and about 8 percent by medical schools elsewhere in Canada.

The number of active GP's in Quebec grew relatively more rapidly than the number of specialists, a trend not found in the United States. As a result, the percentage of GPs among all active physicians in Quebec grew from 39 percent in 1971 to 41 percent in 1975.

The rapid increase in the physician-population ratio brought with it a commensurate increase in the use of physician services per beneficiary. Total payments for physician services per capita (at a constant fee schedule) rose from $32 in 1971 to $44 in 1975, that is, at an average annual compound rate of 9 percent. Total payments per active physician rose at an annual rate of about 2.3 percent. To what extent this increase in per capita utilization of services represents successful satisfaction of hitherto unmet demand cannot be ascertained from these data.

The rather sharp increase in the overall supply of physicians in Quebec does not appear to have had a marked impact on the relative geographic distribution of physicians. The number of all active physicians per capita was unevenly distributed across market areas, in both 1971 and 1975. Although a comparison of the distributions of physicians and population suggests a slight secular movement toward greater equality in the distribution of physicians, it is fair to say that the relative geographic distribution of physicians in 1975 was basically similar to that in 1971.

In terms of absolute numbers of physicians per capita, almost all market areas experienced some positive growth during the period. Areas in which the physician-population ratio actually declined tended to be rural areas experiencing secular decline in population. Relatively more rapid growth in the ratio tended to occur in suburbs of the larger

cities, although several rural areas also experienced above-average growth. Large urban centers did not register above average growth in physicians per capita.

An analysis of physicians' locational choices suggests that, other things being equal, the average gross payment for general practitioners (GPs) in an area tends to exert a positive effect on the migration flow of GPs, although the magnitude of the estimated effect appears to be sensitive to the specification of the model. The migration pattern for specialists was much less tractable.

2. Practice Organization

An analysis of GP practices in Quebec revealed a marked difference between the typical medical practice in Quebec and its U.S. counterpart. GPs in Quebec appear to employ only about a third as many aides per physician as do U.S. GPs. Although they appear to work roughly as many hours per week and year as their U.S. colleagues, they spend substantially more time per patient visit at the office and therefore see only about 60 percent as many patients per hour or week as do their American colleagues. Finally, the average number of days wait time to an appointment with a GP in Quebec appears to exceed the comparable U.S. figure by 60 to 100 percent.

Several possible explanations as to why Quebec GPs employ fewer aides than their U.S. counterparts include the fact that Quebec GPs do not usually operate laboratories in their practices and that billing under the Quebec insurance system is fairly simple, obviating the need for some clerical personnel. An additional factor appears to reside in the fee schedule. Apparently, the level of the fee schedule and the

application of rules requiring physician presence discourages delegation of medical tasks from physicians to auxiliary personnel.

Within Quebec there is substantial inter-physician variation in variables such as physician hours worked per week, weekly and hourly patient visits, aides employed per physician, and so on. An analysis of variance indicates that the factor "geographic area" (i.e., market area) is statistically significant, although it is difficult to discern any systematic pattern among market-area averages of the variables.

In the United States, the hourly and weekly rates of patient visits handled by physicians tend to vary inversely with relative physician density. This pattern is not nearly as discernible in Quebec. If one groups market areas in terms of relative physician density, one does not discern any difference in weekly patient visits per week, nor are there systematic differences in other practice variables. If one controls more carefully for an entire set of factors though to affect weekly visit rates, physician density does appear to have a positive impact on weekly visits (other things being equal), although this association is quite weak. In other words, the data suggest that physicians in areas with relatively few physicians per capita give their patients just as much time per office visit as do physicians in areas with relatively high physician density.

In comparison with U.S. GPs, relatively more Quebec GPs belong to group medical practices. A production-function analysis of the telephone-survey data suggests that, other things (practice-inputs) being equal, group practitioners in Quebec would tend to see about nine percent more patients per hour or week than solo practitioners with identical practice inputs. In fact, however, group practitioners in Quebec appear to employ significantly fewer aides per physician

than do solo GPs, and the actual average weekly office visit rate for GPs in groups is somewhat higher than that reported by solo GPs. An economic evaluation of the production-function estimates supports the conclusion that solo GPs in Quebec employ more aides, on average, than would be required strictly to maximize net income. The analysis suggests that, given the technology of medical practice in Quebec, and given the wages and fee schedule faced by physicians at the time of the telephone survey, the economically optimal number of aides per full time equivalent physician is actually less than one full-time equivalent aide.

3. Composition of Physician Output

An analysis of the changes in the configuration of physician output over the period 1971-75 shows that average quarterly gross payments (for January-March) per active GP in Quebec rose by 13.4 percent, or 3.2 percent per year, while that of general surgeons (GS) rose by only about 2 percent, or 0.5 percent per year. Since average annual gross payments by all physicians over the period grew at an annual rate of about 2.3 percent, it can be reported that the relatively rapid increase in the physician-population ratio during this period did not depress the average gross income of the representative (average) physician in Quebec.

There appears to have been, however, a discernible shift in the composition of physician output. For both general practitioners and general surgeons, the average number of patient visits and consultations per physician decreased by roughly 5 percent per year, while total gross payments per visit or consultation increased commensurately. In other words, there appears to have been a discernible shift towards more

resource-intensive patient visits over the period. There also appears to have been a marked shift from ordinary examinations to the more costly complete and major complete examinations. There was not, however, a substantial shift in the priority of surgical procedures. The performance of lower priority surgical procedures as a proportion of total payments declined for both GP's and for general surgeons.

but relatively fewer surgeons

An analysis of the effects of time and of market area variables on aggregated and disaggregated levels of physician output showed that, controlling for a variety of market-area variables though to influence the level and composition of output, total payments to GPs for all services and total payments for all visits increased by 15 and 20 percent, respectively, during the period 1971-75, while total visits per GP decreased by 9 percent. In 1971, total payments and visits to GPs tended to decrease, with average household income in the physician's market area, other things being equal; by 1975, the sign of this relationship appears to have been reversed.

Finally, other things being equal, the effect of relative physician density in a market area on the level and mix of physician output was found to be generally small. Although physician density does appear to have some negative effect on output and payments per physician, other things being equal, the conclusion seems warranted that the dollar value of output per physician remained relatively constant as the number of physicians in a market area increased. This conclusion emerges from the analysis of physician gross payments over time (with rapidly increasing overall physician-population ratio) and the analysis of physician payments across market areas at any point in time.

Such maintenance of total output (and payment) levels in the face of increasing physician-population ratios implies commensurate increases in physician services rendered per capita.

4. Medical Utilization Per Capita (All Services)

A closer examination of physician services per capita was conducted by analyzing medical utilization for selected age-sex groups among beneficiaries (males between the ages of five and eight, and females between the ages of fifty-eight and sixty-one). These per capita utilization rates were related to market-area characteristics--for example, physician density and area mean household income, and to the income status of the individual beneficiary. The results from this analysis reveal that for a wide range of physician services, the chronically poor were already receiving in 1971-72, substantially more services per capita than did the non-poor. This situation does not appear to have changed over the period of 1971-75.

While the per capita utilization of surgical procedures increased as the number of physicians per capita increased (at less than one to one), there were not substantial shifts in the composition of these surgical procedures towards lower priority surgical procedures. Combined with the previously reported decreases in lower priority surgical procedures per general surgeon, it is fair to say that, while the physician supply per capita in Quebec increased dramatically between 1971 and 1975, we did not observe shifts towards the lower priority surgical procedures we had selected for analysis.

After controlling for the income status of beneficiaries within an area, it was found that beneficiaries in higher-income areas have

often increased their utilization of physician services at a faster rate than have beneficiaries from lower-income areas. Thus, the Quebec health insurance system does not appear to have effected a relative redistribution of medical services from high-income to low-income areas. It may have done so shortly after the introduction of Quebec Medicare, but since then, the trend, if there is a trend, has been more nearly in the reverse direction.

In reacting to this finding, however, it is well to keep in mind that, in terms of the absolute number of services per beneficiary, virtually all market areas show substantial improvement over the period 1971-75. This increase, it will be recalled, attended the substantial growth in the physician-population ratio almost everywhere in Quebec.

5. Medical Utilization Per Capita (Essential Hypertension)

The analysis of utilization included a more narrowly focused study of a subset of beneficiaries who, at one time, had been diagnosed as having suffered from essential hypertension. In many respects, the results parallel the patterns of overall utilization reported above, but there were also some differences.

For the subset of hypertensive beneficiaries, it was found, once again, that low-income beneficiaries receive relatively more services per year than do non-poor individuals, and they also receive more revisits per year. This was true, holding constant, among other things, beneficiary age, sex, location and a proxy measure of health status. Costs per patient year were relatively higher if the physician was a specialist, rather than a GP.

As was reported above, total cost per visit has increased significantly over time for all groups of beneficiaries. Similar cost increases were found for hypertensive visits.

An analysis of annual visits and costs per beneficiary across market areas suggests that relative physician density does not have a pronounced effect on either cost per patient year or the revisit rate. The GP-population ratio of a market area does appear to have a small positive effect on both annual visits and costs. On the other hand, the specialist-population ratio appears to exert a negative influence on both variables, other things being equal.

Further analysis showed that the higher cost per patient year for low income hypertensives was decreasing during 1971-75, compared to the non-low income beneficiaries. This result differs from the general utilization of all medical care, as reported above, wherein the differences between low income and non-low income persons remained relatively unchanged between 1971 and 1975.

Although beneficiaries with essential hypertension residing in high income areas (holding constant family income) tend to have higher costs (and services) per year than do beneficiaries in low income areas, the difference did not appear to increase over time. In other words, contrary to the general utilization results, when examining utilization for one specific diagnostic condition, it does not appear that persons in high income areas have increased their relative utilization, compared to beneficiaries in low income areas.

VIRGINIA PHYSICIAN RESPONSE TO CHANGES IN CODING TERMINOLOGY

BY

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In October of 1975, the Virginia Medical Assistance Program (VMAP) converted its procedure reporting nomenclature from NBS (National Blue Shield Physician Treatment Codes) to CPT2 (Current Procedure Terminology, 2nd Edition). This conversion occasioned the basis for our research which tested the idea that a change to an "unpackaged" procedure coding system would lead to higher charges for physician services and increased program costs. Data on which our conclusions are based include six months of claims disposition and claims history data prior to the conversion and one year's worth of identical data following the conversion. The hypotheses tested were based on Sobaski's 1975 study which suggested that ". . . a more detailed scale of values could give doctors the opportunity to minimize the number of lower valued services performed and reported, and increase the number of higher valued items."[1] We expected that the Virginia Medicaid program's conversion would alter the manner in which participating physicians bill for services

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[1] Social Security Administration, Office of Research and Statistics, Effects of the 1969 California Relative Value Studies on Costs of Physicians' Services Under SHI, DHEW Pub. No. (SSA) 75-11702, June 20, 1975.

performed, and that these changes in billing practice would be reflected in several indicators of system performance. The specific changes anticipated and the actual findings are summarized below:

1. The anticipated selection of higher priced procedures should have resulted in:

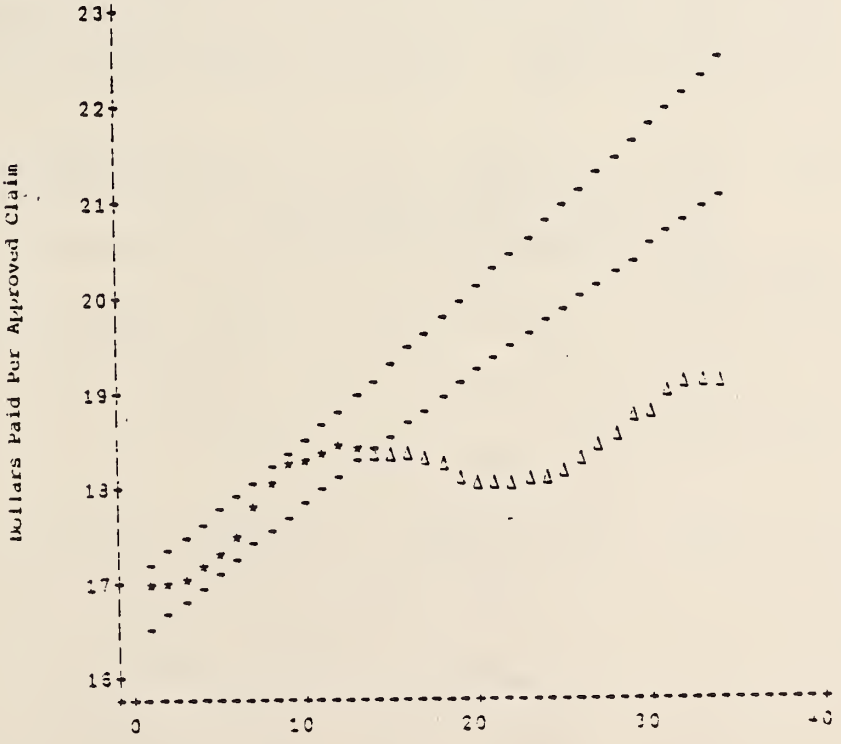
   - More claims submitted after the conversion than would have been predicted by system growth. In fact, about 4.5% more claims were processed than predicted on the basis of pre-conversion trends. Three percent of this increase occurred during the six month "transition effect" period immediately following the conversion.

   - Proportionately fewer claims approved, due to inappropriate billings. Instead almost 4% more claims were approved during the 6 month "transition" immediately following the conversion than predicted. During the entire period covered by our research, this percentage has fallen to about .7% above the pre-conversion trend for approved claims.

   - Higher total payments than would be predicted by system growth and inflation. Although actual dollars paid increased from the pre- to the post-conversion periods, these values were 9.3% below

the seasonally adjusted predictions based on the pre-conversion trend. Figure 1 demonstrates the degree to which payments deviate from their pre-conversion prediction interval. These findings provided the first intimation that the conversion may not have had the impact dictated by our hypothesis.

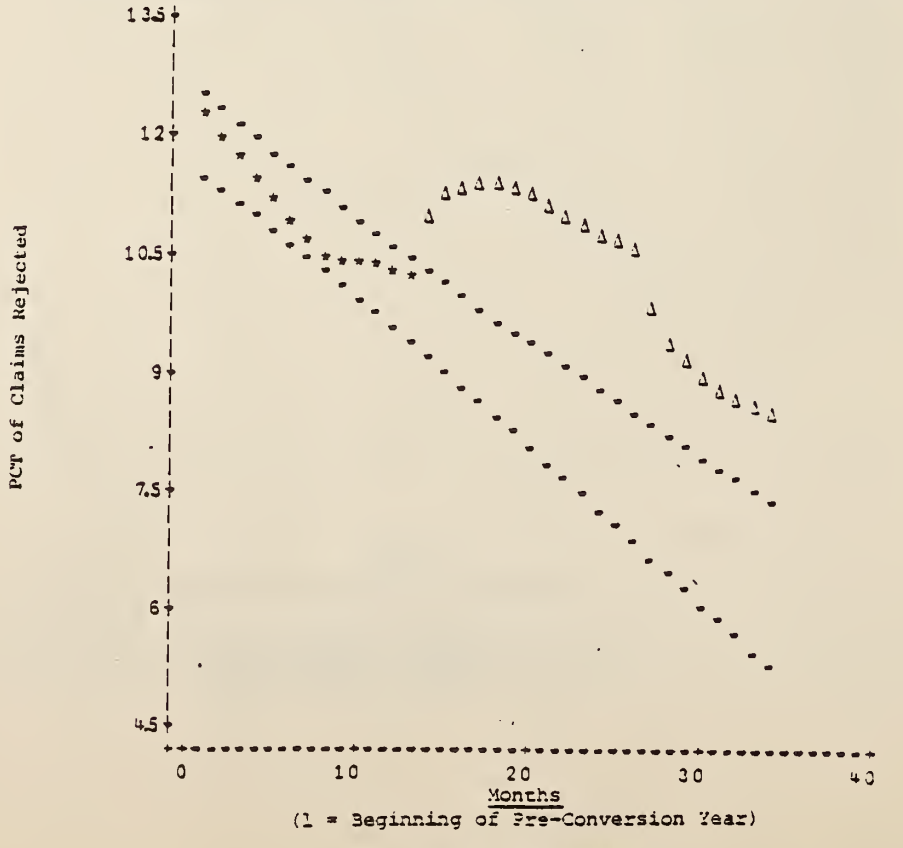
FIGURE 1: Moving Averages for Dollars Paid per Approved Claim and Values Calculated for 95% Prediction Interval for Pre-Conversion Trend



2. Difficulties in using the new system would be reflected in claims disposition indicators, including:

   - A higher rate of claims rejected. The number and proportion of claims rejected increased dramatically in the months immediately following the conversion but later resumed and fell below pre-conversion levels. The initial increase, however, was sufficient to push the total number of rejected claims 34% above the trend predicted on the basis of the pre-conversion pattern. By the end of our post-conversion period this percentage had fallen to 14.5% and appears to be still falling. Figure II shows these data.

FIGURE II: Moving Averages for Per Cent Claims Rejected and Values Calculated for Prediction Intervals for Pre-Conversion Trend



- A higher rate of claims pended. The number of claims pended did not increase to the extent predicted by pre-conversion trends, nor did the proportion of claims pended exceed pre-conversion levels.

- A higher rate of claims denied. The number and proportion of claims denied were not affected by the conversion. In fact, there were proportionately fewer claims denied during the 13 months immediately following the conversion than prior to the conversion.

3. The propensity to choose higher priced procedures was expected to be reflected in higher charges and payments per approved claim. The data, however, did not fulfill these expectations.

   - While the absolute value of physician charges per approved claim was 13% higher during the post conversion months, the increase fell 13% short of amounts predicted on the basis of highly consistent pre-conversion trends.

   - Dollars paid per approved claim increased 3% during the post conversion period. This increase, however, is 12% less than amounts predicted on the basis of pre-conversion trends. For the two years prior to the conversion payments per procedure were increasing at a rate of 9% a year. Since the conversion, (eliminating the six month transition effect period) this rate has fallen to -1.5%.

When dollars paid per approved claim are considered in relation to dollars charged per approved claim, proportionately fewer dollars were paid per dollar charged for an average claim during the post-conversion period. In other words, the conversion maintained and widened the gap between charges and payments for the average claim.

Table 1 summarizes VMAP claims data from 1 year prior to the conversion through the present.

TABLE 1 VMAP CLAIMS DATA

	PRE-CONVERSION	TRANSITION	POST-CONVERSION	LATEST
% Approved	78.6	75.2	81.2	80.5
% Rejected	10.2	12.2	8.6	9.1
% Denied	4.6	4.2	4.2	4.1
% Pended	6.1	7.8	5.5	5.9
$ Charged per Approved Claim	$22.77	$22.39	$25.76	$26.63
$ Paid per Approved Claim	$18.39	$17.31	$19.10	$18.79
% of Charges Actually Paid	80.8	77.3	74.1	70.6

4. The degree of unpackaging[2] for each category of physician service was expected to correlate with changes in payment per episode of service delivery ("procedure occurrence"). The "degree of unpackaging" was determined to be unrelated to observed changes in dollars paid per procedure. The fact that more CPT procedures were available to describe a service formerly encompassed by fewer NBS procedures did not imply an increase in payment per procedure. During six month transition period payments per procedure dropped from $12.59 to $12.33. By the end of the first year payments per CPT procedure had increased to $12.83.

Payments per procedure occurance increased within each area of medical terminology (Surgery, Radiology, Pathology and Medicine).

TABLE 2 PAYMENTS PER PROCEDURE OCCURANCE BY AREA UNDER CPT AND NBS

	NBS	CPT	% INCREASE
Surgery	$84.84	$95.71	12.8%
Radiology	$ 9.29	$10.23	10.1%
Pathology	$ 4.12	$ 4.52	9.7%
Medicine	$10.68	$11.04	3.4%
TOTAL	$12.59	$12.83	1.9%

[2] "Degree of unpackaging" refers to the number of specific CPT procedures that have replaced equivalent NBS procedures. Thus, we would expect payment per procedure occurrence to increase (from the pre- to post-conversion period) as the number of procedure choices increases.

The increase in total payment per procedure (1.9%) is small when compared to the changes within each of the four areas. This finding is the result of a shift in the relative usage of procedures among areas. Table 2 summarizes the distributions of procedure occurances under the two coding systems.

TABLE 3 DISTRIBUTION OF PROCEDURE OCCURANCES

	NBS	CPT
Surgery	4.71%	3.74%
Radiology	9.71%	9.44%
Pathology	21.71%	20.03%
Medicine	63.80%	66.79%
TOTAL	100.00%	100.00%

5. Summary and Conclusions

The findings presented above along with the data contained in our complete reports, suggests the following conclusions:

- After the initial termoil caused by the mechanics of the conversion, the system has operated more smoothly than before (i.e., fewer pends, rejects, and denied claims).

- After initial fluctuations, payments per claim have leveled off at a point below pre-conversion projections.

- Charges per claim have maintained an upward trend.

- The conversion to CPT increased payments per procedure particularly within the area of surgery.

- However, when the changed "mix" of procedures is taken into account, a net increase payment per procedure occurance of only 1.9% results. Thus, while the conversion did produce an immediate noticeable impact upon the program, the long term costs of the program have not been significantly altered through the conversion to a new procedural terminology.

PHYSICIAN INVOLVEMENT IN HOSPITAL DECISION MAKING

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The focus of government health care policy over the past two decades has subtly changed from earlier commitments to provide health care to all who are in need. While assurance of access to care is, of course, still of great concern, the foremost policy issues of today revolve around ways to constrain future increases in health care costs. And the major policy battleground is the hospital sector, where the most serious health care cost increases have occurred.

A number of as yet untested proposals are being offered to combat inflation in the hospital without unduly limiting access to or quality of care. These suggestions include certificate-of-need laws, hospital rate review, various forms of prospective reimbursement, remission to direct wage and price controls of the Economic Stabilization era, or market strategies revolving around the growth of Health Maintenance Organizations.

This is a condensed version of a paper that is to appear in Hospital Cost Containment: Selected Notes For Future Policy, edited by Michael Zubkoff, Ira Raskin, and Ruth Hanft for Milbank Memorial Fund, early 1978.

The research reported here reflects the private views of the author and does not necessarily represent an official position of the U.S. General Accounting Office.

However, too often in attempts to conceptualize the process by which the hospital sector will react to one or more of these control mechanisms, a central and overriding feature of the U.S. hospital system is omitted. The unique relationship between the hospital and the physician in the production of health care in this country is ignored by many of those attempting to understand or predict the behavioral reaction of hospitals to specific government policy. Instead, the hospital is typically viewed as an institution differing from ordinary firms only to the extent that a major portion of hospital care is provided in a not-for-profit setting.

An explanation for the lack of a strong physician figure in most models of hospital behavior can probably be traced to the payment mechanism for health care in the U.S. The patient hospitalized here is typically subject to two separate billings; one for "hospital" services and one for "personal physician" services. This dual billing system has led to a conceptually false dichotomy whereby the hospital and physician are often erroneously viewed as independent entities selling services in functionally segmented health markets. Yet from the patient's point of view, "health care" in a hospital setting should be viewed as a single product jointly produced by the combined actions of hospitals and physicians.

In this paper we attempt to more specifically delineate the roles that the physician may play in strategies aimed at controlling cost increases in hospitals. Any effective mechanism for containing the ongoing rapid rises in hospital costs must explicitly take into account the involvement of physicians in hospital decision making. Few administrators like to admit how limited is the control they have over the operation of their hospital. They would like to believe that by their efforts alone, order

and direction are distilled form anarchy. Yet it is the physician, operating as a separate entity outside the control of the Board of Trustees or the administrator, who directs most of the major resource decisions made in the hospital setting. The physician recommends admission, takes responsibility for ordering diagnostic procedures and therapeutic measures, and determines when the patient is fit to leave the hospital. In addition, it is the physician who typically engages in a lobbying effort with hopes of committing the administrator and trustees to invest in additional bed space, in personnel to help the physician provide more and better patient care, and in new and expensive technology.

A model of complete physician control, while admittedly an abstraction of reality, is close enough to still be considered a useful tool for analyzing various policy formulations. (See Pauly and Redisch (1973) for a rigorous statement of such a model). The two lines of internal authority in the hospital can lead to inevitable conflict between administrators and physicians, particularly under a regime of unconstrained cost reimbursement. In fact, the administrator typically finds his own job security most closely tied to his ability to satisfy the demands of the medical staff. Viewed in this extreme light, the administrator's role is simply to provide labor, supplies, and facilities to independent physicians. It is the physician who directs the actual provision of care in the hospital.

Trustees are also organizationally structured to exert external control on physician behavior. In a not-for-profit hospital there are no stockholders or owners of equity capital. The Board of Trustees presumably represents

the public interest and bears some form of legal and moral responsibility for all activities, professional and otherwise, which occure within the institution. However, while each member of the typical Board is a competent individual in his own field, he is unprepared for participation in the types of issues and decisions involved in the management of the hospital. Ordinarily he has limited knowledge of the medical profession and his knowledge of the hospital is usually restricted to personal contact as a patient or as a relative of a patient.

The dominance by physicians of resource decision within the hospital can be tied to the ten to twenty percent annual increases in per diem costs since 1965. These cost increases are critically related to changes in the quantities, qualities, and sophistication of the services which are lumped together under the output designation of a patient day. The origins of this rise in the volume of labor and nonlabor inputs utilized per patient day can be traced in part to the ability of the physician over time to reduce his own input or operating costs by transference of functions and costs to the hospital.

If this transference were done in an economically and socially efficient manner, then society could capture the potential gain generated from substitution of low cost hospital inputs for high cost physician time. While hospital costs would register increases, these would be more than compensated for by decreases in aggregate physician bills to patients. However, this does not appear to be what has occurred.

There are three forces at work that tend to mutually reinforce the physician's incentive to utilize hospital services in an economically inefficient manner. The separation of physician and hospital bills

for jointly produced health care, the proration of basic hospital service costs over all patients, and the pervasiveness of insurance for hospital services all make the apparent cost to the physician of additional hospital service very small relative to the true social costs of the inputs used to produce that service. This creates major incentives for the physician to oversubstitute hospital inputs for his own labor and to order the production of only marginally beneficial health and hotel services in the hospital.

While the number of inputs used to produce basic hospital room and board services have increased over time, the really dramatic increases in hospital resource intensity seem to be related in large part to increases in the availability and utilization levels of a set of diagnostic and therapeutic medical services provided in a hospital setting under the direction and control of physicians. This can be seen quite clearly in Table I. Over a period of time (1968 through 1971) in which the number of operating room visits per adjusted patient day actually declined slightly in these sample hospitals, we can see explosive growth in the per adjusted patient day utilization levels of seven medical services (pathology tests, nuclear medicine procedures, pharmacy line items, inpatient and outpatient laboratory tests, inpatient and outpatient radiology procedures, therapeutic radiology procedures, and blood bank units). There is no break in the general pattern when hospitals are grouped into separate bedsize classes. In a separate paper by the author (see Redisch, 1974), hedonic cost indices are estimated which suggest that the growth of these seven medical services account for more than one third of the increase in cost per adjusted patient day in the sample hospitals. Since approximately one half of the per diem

TABLE I 1/ 2/

	1968	1969	1970	1971	% Change 1968-1971
Operating Cost	55.51	60.89	69.60	78.75	41.8%
Operating Room Visits	.05456	.05071	.05223	.05373	-1.5%
Pathology Tests	.06327	.11652	.11504	.10914	72.5%
Nuclear Medicine Proc.	.00252	.00705	.00690	.00965	282.9%
Pharmacy Line Items	.35610	.79150	.91918	1.0449	193.4%
In & Outpatient Lab Tests	2.2046	2.2964	2.5393	2.8588	29.7%
In & Outpatient Radiology Proc.	.31753	.31604	.33519	.36378	14.6%
Therapeutic Radiology Proc.	.00685	.01394	.01577	.01894	176.5%
Blood Bank Units	.03759	.05881	.05333	.06333	68.5%

1/ All figures are reported in whole units normalized on adjusted patient days. Thus in 1968 operating cost per adjusted patient day in the sample was $55.51 and the average number of pathology tests per adjusted patinet day was .06327.

2/ The data were provided by the Health Services Research Center (the Center) of Northwestern University and the American Hospital Association (AHA). It was obtained by the Center from the Hospital Administrative Services (HAS) Division of the AHA. Data is submitted to HAS on a monthly basis by several thousand voluntarily participating hospitals. These hospitals may then compare their performance in providing services with that of similarly situated institutions. No payment for services is based on the completed HAS forms, and the data is not audited. The original sample consisted of almost 400 hospitals. After eliminating those hospitals that did not appear in one or more years, we were left with a final sample of 285 hospitals.

cost rise is related to rises in unit costs of basic inputs, these estimates imply that two thirds of the increase in real inputs per adjusted patient day in the sample hospitals were related to increases in the per diem use of these seven medical services.

This ancillary service growth that has contributed such a large share to the rise in per diem hospital costs is under the direct control of the physician. This documentation of the pervasive influence of physicians in determining resource allocation within the hospital implies that control measures to hold down the rate of inflation of hosiptal costs, if aimed solely at the hospital, will be disappointing. Certificate-of-Need, rate review, or alternative forms of prospective reimbursement all do provide the administrator with an added rationale for confronting and standing up to the physician staff. Yet the benefits to the administrator of siding with the staff are usually so high that true confrontations are exceedingly unusual.

Most hospital administrators see themselves in competition with other hospitals for physicians, not for patients, since it is only through a physician that an individual may be admitted to a hospital. As long as there are other hospitals that will admit him to practice, a physician is not totally dependent on a particular hospital for his livelihood. But a hospital that cannot retain a satisfied medical staff will soon find its occupancy rate falling, its per diem costs rising, and its ability to function as a health care institution seriously impaired. Furthermore, if cost guidelines are given to a hospital on a per diem basis, many administrators may find themselves in the seemingly paradoxical situation of sanctioning certain marginal equipment and personnel decisions or capital projects to

attract or keep physician staff so that the occupancy rate will be high enough to move the hospital within the per diem cost constraints.

It is not surprising that administrators will put off as long as possible the inclusion of medical staff into any negative budgetary decisions that must be made. Cost containment is initially considered an administrative issue, not a medical one. If hospital budgetary controls are made so tight that they cannot be met by simply eliminating any administrative slack in the hospital, then affiliated physicians will have to become more directly involved in the hospital's budgetary process. However, even when the administrator is forced to confront his medical staff on cost issues, he is at a disadvantage. Physicians can argue persuasively and with a unique degree of authority about medical need and quality of care. It is difficult for the lay administrator to pick and choose among these arguments and make resource decisions that hurt one physician group but not another. Even when these types of negative decisions are chosen, they are most likely to be based on the degree of power of the various physician specialty groups within the hospital, rather than on criteria based on some nebulous concept of social efficiency norms.

A more effective control mechanism might make an impact on the physician directly, rather than through the administrator. Yet the costs of policing physicians through direct regulation on a case by case basis can be excessive. Medical cases are highly differentiated goods. No two patients are ever exactly the same, even if they exhibit the same general set of symptons. If the decision to hospitalize were based solely on medical reasoning, the physician would be hospitalizing a disease rather than a person with a disease.

Direct government intervention through the regulatory or rate review process also does not appear to be the panacea that will bring hospital cost inflation in line with price rises in the rest of the economy. There is a real danger that health care regulation will be an institution proposed and supported by members of the industry as a mechanism for supplanting whatever competitive elements remain with a legal, enforceable cartel. This view would allow for state hospital associations to petition their legislatures to put them under the protective umbrella of a state mandated prospective reimbursement system that is meant to guarantee an "adequate" cash flow to each hospital. This view would also encompass the use of Comprehensive Health Planning by local hospital groups as a vehicle for keeping Health Maintenance Organizations and proprietary institutions from encroaching on their territory.

Even if direct hospital regulation turns out to be a moderate success, its role will be enhanced even more by some basic structural changes in the way physicians are educated and reimbursed. Today the typical physician, acting in the interests of himself and his immediate patients, puts little weight on the larger issues of economic efficiency and social benefit. This attitude has been reinforced by the strong technological imperative instilled in physicians during their medical training programs (and is tacitly encouraged by the present cost based system for financing hospital care).

The professional training of physicians has traditionally not emphasized the concept of the physician as a manager of health care resources confronted with complex issues of cost and efficiency. Instead, the physician emerges from his training period with a perception of the hospital as a rent-free workshop, a place where he feels justified in pressing administrators and trustees to add those medical care inputs that allow for full, modern treatment of patients while simultaneously enhancing the physician's income and prestige.

This phenomena is, of course, closely linked to the explosive growth in the opportunities for application of new and high cost technology in health care. The growth of technological applications in health care has interacted with the current orientation of medical training programs in a feedback mechanism that is leading the health care system down an explosive path. The new high cost, hospital technology necessitates specialization and fosters a narrow professionalism among new physicians. That is, for reasons relating to income, prestige, and the way that modern medicine is practiced, new physicians are drawn away from a primary care, office-based setting and toward the practice of specialized medicine within an urban, institutionalized setting. This trend toward medical specialization in turn creates ever greater demands from physicians to induce hospitals to adopt still more technology, completing the cycle and starting it anew.

The greatest potential in utilizing the physician to contain hospital costs may lie in the movement, whenever possible, away from fee-for-service as the method of reimbursing physicians and away from a system in which individual physicians control hospital inputs without bearing any responsibility for them. This type of movement, if feasible at all, would probably have to take place in piecemeal, incremental fashion. Capitation or salaried service may marginally increase in popularity, but it seems clear that, even with a major restructuring of the health care system through national health financing legislation, these two methods of reimbursing physicians will for some time at best appear as options to physicians who desire alternatives to fee-for-service. Any new system, to be politically feasible, must meet with at least grudging acceptance by physicians.

Adoption of a "European" style health care system, with hospitals primarily the domain of salaried specialists, and with general practioners operating independently in office based settings, would seem to be a step in this direction. Many physicians are already practicing in hospitals on a straight salary. These would include interns and residents (who comprise more than 20% of active physicians in many states), full time salaried chiefs of staff, and other physicians serving educational functions. Other physicians might be induced to practice as a salaried hospital physician if the salary were at a high enough level. (While many physicians are ideologically opposed to anything but fee-for-service reimbursement, others are concerned not about ideology but about levels of income and hours of work today and in the future).

However, adoption of a European style system for the United States would present many problems. There would have to be a determination of the level of physician salaries and of payment responsibilities. State laws against the corporate practice of medicine would have to be redesigned (they are currently being rewritten in many states to allow for the functioning of HMO's). A way would have to be found to gradually allow new staff privileges only to salaried specialists. And more importantly, while this system removes many of the perverse incentives individual physicians face with respect to the utilization of hospital resources, it does nothing by itself to provide incentives to the hospital to contain costs.

The major physician related impetus to cost containment in hospitals may come from the growth and encouragement of non-foundation type HMO's. It has been suggested that these HMO's keep hospital costs in check not by the organization as an entity going at risk to provide medical care, but from the actions of staff physicians who are removed from fee-for-service reimbursement, who practice in multispecialty groups, and who do not operate with complete autonomy with respect to resource control.

In the end it must be remembered that the search for a single panacea to contain hospital and other health care costs is likely to be a futile one. There are major forces at work in the health care arena. They are related to the interaction of physician incentives, patient passivity (induced in part by high levels of insurance), new technology, and cost related hospital reimbursement. These forces are not unique to the U.S. health care system. Costs of hospital care and other forms of health

care can be observed to be rising rapidly in many societies operating under a wide range of regulatory activity and financing arrangements. The lesson to be learned is that there does not appear to be a single, simple solution to the health care cost crisis. Instead, the problem is one that will have to be solved (or at least partially alleviated) through a number of small, discrete steps. Utilizing the physician as a lever to help contain hospital costs in one of those steps.

SUMMARY

Mark Pauly, "The Effect of Medical Staff Characteristics on Hospital Costs."

1. Purpose of Project

The purpose of this project was to examine the feasibility and usefulness of combining data on characteristics of a hospital's medical staff with data on its costs. The fundamental premise was that physicians have important effects on differences in resource use within hospitals. Some of those differences might reasonably be attributed to identifiable physician characteristics. It seems reasonable to suppose that a hospital's costs, and some other measures of its expensiveness as well, measure the resources used to provide hospital care. To the extent that physicians with different characteristics systematically combine inputs to produce outputs in different ways, hospital costs might be associated with those physician characteristics.

2. Feasibility of Data Collection

The final data base used in the analysis of this project consists of four major sets of information:

1. 79615 discharge abstracts containing primary and secondary diagnoses, and other important clinical and demographic characteristics for each inpatient discharged during 3 months from 50 California community hospitals, for the period April-July 1975.
2. The characteristics, expenses, revenues, etc. of the 50 community hospitals in which the 79615 patients were treated.
3. The characteristics of 2861 physicians who admitted, attended and/or treated 70013 of the 79615 patients in the above 50 hospitals.
4. Hospital control, facilities, and annual aggregate cost and output data for the 50 hospitals obtained from American Hospital Association Guide Issue data.

This data set was assembled by combining patient discharge

abstracts from the California Health Data Corporations' (CHDC) MR II system with cost data from the Hospital Administrative Services Program of the American Hospital Association. Data on physician characteristics from the American Medical Association's Directory was combined with patient records by CHDC. Physicians who accounted for an average of two or fewer patients per month were not included; this deletion cut the required number of physicians whose characteristics were to be documented by nearly half, but reduced the number of cases for which physician characteristics were present by only 8 percent. Some of the initial sample of 60 hospitals were dropped because they provided incomplete data on physician names or because it was impossible to match many of their physicians.

It was therefore possible for CHDC to link physician and patient data for almost all patient records in almost all hospitals. The final data set contains no identification of individual hospitals, patients, or physicians. All data was edited and cleaned.

3. Conceptual Framework

The conceptual framework used to analyze this data is based on the notion that the cost incurred in treating any patient is based on the patient's characteristics, the characteristics of the physicians who treat him, and the general characteristics of the hospital and its medical staff. Individual physician characteristics are thought to measure human capital endowments, and so may be expected to affect the efficiency of the hospital production process. The most important observable human capital variable in the data set are the physician's age and his specialty, although some geographic aspects of training are significant also. An important general characteristic of the medical staff is the concentration of output among staff physicians, a variable which, based on the well-known "size principle", should reflect both the price incentives to individual physicians and the problems of coordinating physician decisions. A behavioral model of the hospital in which the size principle operates but in which medical staff and administration share power was developed.

Such a model suggests that, if physicians control the hospital, costs and output concentration will be inversely related, whereas if the administration has some power and if it desires costs to be lower than do physicians, output concentration could be directly related to cost.

The behavioral-cost-function model is applied to two sets of data. One set consists of individual patients and physician characteristics data for patients with 22 common diagnoses. Total charges (as well as length of stay) are used as measures of costliness. These results will not be reported here.

The second set of data uses total hospital cost as the measure of costliness. An index of non-obstetrical casemix was developed by using relative charges as weights. Its usefulness in a hospital cost function was validated with another set of data. This index, along with a measure of the proportion of obstetrical discharges, is used to measure diagnostic mix.

Regression analysis indicated that both casemix and medical staff characteristics affect hospital costs. Both sets of variables are significant. The set of casemix variables reduces unexplained variance by 28 per cent, but the set of medical staff characteristics variables reduces unexplained variance by 38 per cent.

Hospital total costs were found to be significantly related to input prices, to the volume of hospital admissions (adjusted for outpatient visits), casemix, and two kinds of medical staff characteristics. One type of medical staff characteristic is the concentration of output among staff physicians. This is measured in two ways - by the fraction of output attributed to physicians who treat on the average two or fewer cases per month, and by an index of the concentration of output among other physicians. Both variables suggest strongly that costs will be higher the less concentrated is output among physicians. Indeed, apparent decreasing returns to scale in hospitals are changed to approximately constant returns when these variables are added. The implication is clear: diffusing a given number of patients among more physicians raises hospital costs. Adding the physician variables, especially the output concentration variables, substantially increases measured returns to scale.

The second kind of characteristic is staff specialty. Holding measured casemix constant, the specialty of attending physicians significantly affects hospital cost. Costs are significantly higher when there are larger proportions of pediatricians on a hospital's staff, and they are lower when there are larger proportions of general surgeons, and specialists who are neither surgical nor medical. Otorhinolaryngologists and other surgical specialists do not affect cost; the coefficients for internists and obstetricians are reasonably large but are not estimated precisely.

When an alternative measure of casemix based on fourteen diagnostic groups was used, the results were approximately the same. Indeed, using this second measure the estimated negative effect on costs of output concentration among physicians was even stronger. If length of stay is included as an independent variable, many physician staff variables and the casemix measures cease to be important. Interestingly, the coefficient on LOS is approximately one, indicating that the long run marginal cost of a day of stay is approximately equal to its average cost.

Total costs are disaggregated into costs for four hospital departments: nursing, professional (laboratories), general (housekeeping), and administrative. The regression analyses of these costs can be viewed either as cost functions for the intermediate outputs or as input demand functions.

Medical staff characteristics have the strongest effect, as expected, on the nursing department. The output concentration index and physician

specialties are most important here. Input prices, of course, are also important. Professional services department costs are affected very strongly by casemix, but not by medical staff characteristics. Except for the fraction of output for which the attending physician admits two or fewer cases per month, medical staff characteristics do not have a strong or consistent effect on costs in other departments.

Policy Implications. The significance of these staff variables has implications for hospital incentive or prospective reimbursement schemes. Other things equal, those hospitals which have "low-cost" physicians on their staffs will lose if payments do not take account of staff composition. The precise way in which hospital incentive payments might affect medical staff behavior (if it is affected at all) is not known. The importance of these staff effects suggests that it would be desirable to investigate incentives targeted directly on the medical staff, rather than diffused throughout the hospital's corporate structure.

Table 1: Cost Function Regressions: Alternative Prices and Deflators

Means, Standard Deviations and Regression Coefficients ("t" statistics in parentheses)

VARIABLE	INPUT PRICES - Dept. Expenses per Manhour				INPUT PRICES - Wages and Salaries per Manhour			
	Mean Value	S.D.	Using P_2 as Deflator	No Deflator	Mean Value	S.D.	Using P_2 as Deflator	No Deflator
Adjusted Admissions	1977	1486	.926 (9.35)	.884 (9.27)	1977	1486	.895 (8.01)	.882 (9.27)
Nursing Services Price (P_1)	6.85	4.50	.744 (3.96)	.479 (2.22)	5.35	0.77	1.146 (2.23)	.189 (.47)
Dietary Services Price (P_2)	14.83	4.51		.106 (.732)	5.80	0.99		.339 (1.63)
General Services Price (P_3)	9.50	3.06	.165 (1.64)	.072 (.706)	4.05	0.69	-.723 (-1.81)	-.338 (-.96)
Administr. Services Price (P_4)	15.14	4.31	-.172 (-1.51)	-.206 (-1.86)	4.99	0.92	.217 (.84)	*
Location in Large Urban Area	0.62	0.49	.128 (2.28)	.139 (2.53)	0.62	0.49	.092 (1.32)	.151 (2.48)
Casemix Index	0.99	0.07	1.647 (2.86)	2.022 (3.65)	0.99	0.07	2.854 (4.05)	2.681 (4.45)
Proportion OB	0.11	0.07	-.058 (-1.75)	-.048 (-2.07)	0.11	0.07	-.047 (-1.23)	-.056 (-1.71)
Output Concentration Index	0.07	0.10	-.144 (-1.67)	-.113 (-1.28)	0.07	0.10	-.095 (-.88)	-.099 (-1.08)
Proportion Missing	0.12	0.07	.107 (2.59)	.133 (3.21)	0.12	0.07	.110 (2.04)	.139 (3.12)
Prop. Adm. with Prim. Attending (P.A.) Board Certified	0.65	0.14	-.049 (-.411)	-.078 (-.70)	0.65	0.14	.032 (.72)	-.026 (-.67)
Proportion P.A. Pediatrician	0.03	0.06	.037 (1.68)	.036 (1.71)	0.03	0.06	.039 (1.50)	.038 (1.71)
Proportion P.A. Internal Med., other Med.	0.14	0.08	.058 (1.05)	.040 (.74)	0.14	0.08	-.075 (-1.17)	-.049 (-.89)
Proportion P.A. General Surgeon	0.13	0.06	-.118 (-2.56)	-.087 (-1.93)	0.13	0.06	-.043 (-.78)	-.038 (-.82)
Proportion P.A. OBG	0.05	0.06	-.009 (-.730)	.034 (.80)	0.05	0.06	.104 (2.28)	.093 (2.38)
Proportion P.A. OBG	0.15	0.11	-.008 (-.926)	*	0.15	0.11	-.014 (-.40)	.008 (.81)
Proportion P.A. other surg. spec.	0.15	0.09	*	-.011 (-.68)	0.15	0.09	-.069 (-1.06)	-.026 (-.46)
Proportion P.A. other specialty	0.04	0.09	-.047 (-2.01)	.035 (1.54)	0.04	0.09	-.019 (-.78)	-.018 (-.89)
Constant			5.029 (5.93)	6.956 (5.83)			5.878 (6.12)	7.596 (7.97)
R^2			.982	.979 (.00)			.968 (.00)	.977 (.00)
$\bar{R}^2$			.973	.968			.951	.964

* = t level below critical value

Table 2: Stepwise Cost Function Regressions Using P2 as Deflator ("t" statistics in parentheses)

VARIABLE	Adj. Admn. only	Added Variable: Input Prices	Added Variables: Location in Large Urban Area	Added Variables: Proportion OB Casemix Index	Added Variables: MD Staff Variables	Adj. Admissions MD Staff Var.	Adj. Admissions Input Prices MD Staff Var. Location
Adjusted Admissions	1.278 (21.66)	1.077 (22.11)	1.078 (22.34)	1.068 (21.96)	.926 (9.35)	1.017 (6.52)	.928 (8.74)
Nursing Services Price (P_1)		.750 (3.62)	.735 (3.58)	.747 (3.97)	.744 (3.96)		.740 (3.60)
Profess. Services Price (P_2)							
General Services Price (P_3)		.219 (1.93)	.221 (1.96)	.182 (1.76)	.165 (1.64)		.225 (2.08)
Administr. Services Price (P_4)		-.106 (-.85)	-.120 (-.97)	-.097 (-.86)	-.172 (-1.51)		-.181 (-1.49)
Location in Large Urban Area			.089 1.39	.131 (2.20)	.128 (2.78)		.129 (2.07)
Casemix Index				1.300 (2.94)	1.647 (2.86)		
Proportion OB				-.045 (-2.24)	-.058 (-1.75)		
Output Concentration Index					-.144 (-1.67)	-.230 (-1.66)	-.220 (-2.49)
Proportion Missing					.107 (2.59)	.115 (1.80)	.074 (1.70)
Prop. Adm. with Prim. Attending (P.A.) Board Certified					-.049 (-.41)	.028 (.15)	-.149 (-1.18)
Proportion P.A. Pediatrician					.037 (1.68)	.026 (.74)	.022 (.93)
Proportion P.A. Internal Med., other Med.					.058 (1.05)	.106 (1.98)	.089 (1.57)
Proportion P.A. General Surgeon					-.118 (-2.56)	-.088 (-1.23)	-.101 (-2.17)
Proportion P.A. (Ob)					-.009 (-.73)	-.016 (-.33)	.034 (1.02)
Proportion P.A. OBS					-.008 (-.93)	-.067 (-2.12)	-.054 (-2.48)
Proportion P.A. other surg. spec.					*	.136 (1.80)	*
Proportion P.A. other specialty					-.047 (-2.01)	-.071 (-2.45)	-.018 (-.87)
CONSTANT	2.215 (5.10)	4.345 (9.89)	4.277 (9.78)	4.406 (10.37)	5.029 (5.93)	3.582 (3.26)	4.495 (5.37)
R^2	.907 (.00)	.961 (.00)	.963 (.00)	.971 (.00)	.982 (.00)	.940 (.00)	.976 (.00)
$\bar{R}^2$	.905	.958	.958	.968	.973	.923	.967

* F level below critical value

Table 3: Departmental Cost Function Regressions/Regression Coefficients (t statistics in parentheses)

VARIABLES	Nursing & Ancillary Dept.		Professional Services Dept.		General Services Department		Administrative Services Dept.	
	Own price	All Prices	Own price	All prices	Own price	All prices	Own price	All prices
Adjusted Admissions	.882 (8.96)	.809 (8.93)	1.067 (6.86)	1.055 (6.60)	1.057 (7.16)	1.032 (7.00)	1.008 (10.02)	.972 (8.90)
Nursing Services Price (P_1)	.371 (1.73)	.720 (3.53)		.578 (1.60)		-.185 (-.55)		.433 (1.37)
Dietetic Services Price (P_2)		-.014 (-.10)	.234 (1.03)	.247 (1.05)		.037 (.16)		-.947 (-.57)
General Services Price (P_3)		-.267 (-2.70)		.023 (.13)	.745 (4.61)	.668 (4.15)		-.062 (-.52)
Administr. Services Price (P_4)		-.406 (-3.85)		-.155 (-.82)		-.409 (-2.38)	.352 (3.17)	.295 (2.31)
Location in Large Urban Area	.114 (1.88)	.114 (2.18)	.108 (1.18)	.089 (.96)	.222 (2.50)	.247 (2.90)	.175 (2.84)	.161 (2.55)
Casemix Index	1.312 (2.30)	1.506 (2.76)	3.617 (4.00)	3.303 (3.47)	1.934 (2.18)	2.107 (2.37)	1.511 (2.48)	1.488 (2.26)
Proportion OB	-.026 (-.78)	-.036 (-1.18)	-.074 (-1.38)	-.072 (-1.34)	-.057 (-1.17)	-.064 (-1.28)	-.033 (-1.00)	-.027 (-.73)
Output Concentration Index	-.194 (-2.12)	-.179 (-2.15)	.124 (.86)	.117 (.81)	-.082 (-.58)	-.065 (-.48)	.113 (1.16)	.120 (1.19)
Proportion Missing	.109 (2.39)	.133 (3.37)	.235 (3.51)	.213 (3.04)	.071 (1.10)	.120 (1.86)	.167 (3.66)	.157 (3.30)
Prop. Ads. with Prim. Attending (P.A.) Board Certified	*	-.057 (-.53)	*	*	-.071 (-.41)	-.089 (-.51)	-.175 (-1.43)	-.209 (-1.62)
Proportion P.A. Pediatrician	.043 (1.89)	.036 (1.80)	.048 (1.40)	.048 (1.36)	.044 (1.29)	.034 (1.07)	.058 (2.47)	.058 (2.44)
Proportion P.A. Internal Med., other Med.	*	.071 (1.38)	-.028 (-.33)	.016 (.17)	*	.056 (.67)	.118 (2.07)	.130 (2.11)
Proportion P.A. General Surgeon	-.020 (-.47)	-.049 (-1.10)	-.073 (-.99)	-.115 (-1.47)	-.071 (-1.14)	-.084 (-1.17)	-.054 (-1.14)	-.064 (-1.21)
Proportion P.A. OBG	.016 (.40)	.040 (.97)	.110 (1.64)	.084 (1.31)	-.025 (-.40)	-.011 (-.17)	-.028 (-.70)	-.021 (-.43)
Proportion P.A. OBS	-.040 (-1.35)	-.019 (-.73)	.034 (.75)	.028 (.60)	-.042 (-.71)	-.014 (-.33)	-.003 (-.10)	-.004 (-.13)
Proportion P.A. other surg. spec.	.028 (.50)	.071 (1.40)	.038 (.45)	.034 (.37)	-.074 (-.91)	-.009 (-.11)	.069 (1.17)	.059 (.97)
Proportion P.A. other specialty	-.022 (-1.08)	-.033 (-1.52)	-.051 (-1.41)	-.056 (-1.45)	-.016 (-.55)	-.037 (-1.02)	-.052 (-2.45)	-.433 (-1.63)
CONSTANT	5.691 (6.08)	7.603 (6.65)	5.829 (3.43)	4.927 (2.42)	2.599 (1.87)	4.652 (2.50)	5.110 (5.59)	5.302 (3.85)
R^2	.974 (.00)	.984 (.00)	.943 (.00)	.948 (.00)	.944 (.00)	.945 (.00)	.966 (.00)	.969 (.00)
$\bar{R}^2$	.965	.974	.929	.936	.921	.929	.957	.961

* F level below critical value

Table 4: Cost Function Regression Results Using Diagnostic Categories as Measures of Casemix (t statistics in parentheses)

VARIABLES	Using Set of Variables which Maximizes $\bar{R}^2$	Using all variables	Mean proportion of discharges (stand. deviation)
Adjusted Admissions	.700 (8.94)	.728 (6.28)	
Nursing Services Price (P_1)	.779 (7.41)	.714 (3.96)	
Professional Services Price (P_2)	Deflator	Deflator	
General Services Price (P_3)	.157 (2.09)	.245 (2.00)	
Administrative Services Price (P_4)		-.564 (-.36)	
Location in large urban area	.128 (2.78)	.186 (2.36)	
Output Concentration index	-.224 (-3.35)	-.240 (-2.50)	
Proportion Missing	.075 (2.47)	.079 (1.82)	
Prop. Adm. with Prim. Attending (PA) Board Certified		-.034 (-.29)	
Proportion P.A. Pediatrician	.030 (1.77)	.033 (1.37)	
Proportion P.A. internal med., other med.	-.057 (-1.48)	-.009 (-.12)	
Proportion P.A. General Surgeon	-.088 (-2.41)	-.080 (-1.67)	
Proportion P.A. OTO		-.051 (-.97)	
Proportion P.A. OBG		-.019 (-.66)	
Proportion P.A. Other Surg. spec.		-.092 (-.89)	
Proportion P.A. Other special.		-.002 (-.01)	

continued....

Table 4 (continued)

Diseases of digestive system	-.249 (-2.00)	-.293 (-1.41)	.131 (.051)
Diseases of genitourinary system	-.380 (-5.34)	-.324 (-3.07)	.111 (.041)
Injuries/adverse effects of medicines	-.192 (-2.80)	-.162 (-1.52)	.103 (.034)
Diseases of circulatory system		-.093 (-.58)	.128 (.037)
Neoplasms	.179 (3.36)	.177 (2.07)	.072 (.032)
Diseases of skin or musculoskeletal system		.062 (.69)	.076 (.038)
Diseases of nervous system or sense organs		.041 (.63)	.044 (.026)
Mental disorders		Does not enter	.030 (.056)
Symptoms	.117 (1.82)	.147 (1.64)	.044 (.018)
Diseases of endocrine system, metabolism, or blood	.195 (2.87)	.082 (.64)	.025 (.010)
Infective or parasitic disease		-.026 (-.35)	.012 (.007)
No sickness or aftercare	-.075 (-3.20)	-.064 (-1.94)	.013 (.012)
Obstetrics		-.004 (-.13)	.117 (.075)
Constant	5.75 (9.76)	4.95 (3.35)	
R^2	.98980 (.00)	.99086 (.00)	
$\bar{R}^2$	.98385	.97965	

STUDY OF REIMBURSEMENT AND PRACTICE ARRANGEMENTS OF HOSPITAL-BASED PHYSICIANS

Objectives--The primary objective of this study was to obtain financial and related data on certain categories of hospital-based physicians (HBPs), and to analyze these data in terms of how both HBP earnings and contractual arrangements vary according to the characteristics of the hospitals and the regions in which they are located. Other objectives included an exploratory analysis of how New York State's prospective reimbursement system has affected HBPs. The study also provided HCFA with recommendations for further research.

Scope--The study was conducted in two phases. Phase I involved a major data collection effort which covered 120 hospitals, 600 departments and 400 contracts. The data, covering each hospital's fiscal year ended in 1975, included 2,600 HBPs. There were 500 radiologists, 425 pathologists, 291 anesthesiologists, 612 cardiologists, 418 emergency room physicians, and 382 other specialists in the sample. Phase I included a comprehensive descriptive analysis of the relationships among the amount of compensation per full-time equivalent (FTE) HBP, the types of compensation arrangements and various hospital, departmental, contractual and other characteristics for three specialties--radiology, pathology and anesthesiology. Phase I also included a descriptive analysis of 185 written contracts between hospitals and either individual or groups of HBPs.

Phase II included an extension of the descriptive analysis into two additional specialties--cardiology and emergency room. We also applied multivariate analysis to the sample data.

Finally, Phase II included exploratory case studies of the effects of prospective reimbursement on HBP compensation and practice

arrangements in ten New York State hospitals.

Throughout the study a number of areas for possible further research were identified and documented.

Study Data--The major categories of data collected from the participating hospitals were:

1. Hospital characteristics, reimbursement data, revenues, expenses and capitalization, and statistics.

2. Census and physician data for the county and SMSA in which the hospital is located.

3. Departmental revenues, expenses, statistics, physician counts, and physician compensation data (including methods and amounts).

4. Data on each HBP contract within the department including terms, physician counts, and compensation data.

The sources of data included Medicare cost reports, AHA data, U. S. Bureau of the Census data, HEW data, AMA data, hospital financial statements and internal records for the fiscal year ended in 1975, and contracts (or other written agreements) between each hospital and its HBPs.

The final report discusses several key definitions that should be taken into account. First, in order to facilitate comparative analysis, the compensation amounts reported for all HBPs who worked less than full-time in a sample hospital have been converted to a full-time equivalent (FTE) basis. Second, the only HBP compensation data available to us was that paid by the sample hospitals. Other possible sources of income (such as other hospitals, private practice, professorships, publications and consulting fees)

are not reflected in our findings, except to the extent that they may be incorporated in the conversion to FTE earnings. Third, the study excludes all HBPs who billed the patients directly, because in these cases the sample hospitals had no knowledge of the HBPs' earnings. Fourth, the term "percentage arrangement(s)" includes all contractual arrangements in which physician remuneration is calculated by applying a percentage factor to either gross or net departmental revenue. The differences between gross and net departmental revenue vary among contracts, but often include deductions for departmental bad debts, contractual allowances, charity care, etc. Finally, the analysis includes comparisons of the remuneration of salaried HBPs versus those on percentage arrangements. These amounts may not be directly comparable because of the difference between net and gross income. The remuneration paid under a salary arrangement often represents net income to the HBP. In the case of a percentage arrangement, the remuneration usually represents gross income, out of which the HBP typically must pay for a variety of fringe benefits and malpractice insurance, and occasionally for certain costs of operating a department.

Major Findings--The major findings of the descriptive analysis were:

1. The five specialty departments contribute significantly to the total gross charges (29%) and total fully allocated costs (22%) of their hospitals.

2. The total HBP remuneration represents a significant portion of the total direct costs in these departments (ranging from under 30% in pathology to over 70% in anesthesiology).

3. Average full-time equivalent earnings were: radiologists--$103,200, pathologists--$98,400, anesthesiologists--$80,000, cardiologists--$63,000, and emergency room physicians--$54,700. (Table 1).

4. Salary arrangements are associated with lower average FTE earnings, and percentage arrangements with higher average FTE earnings. (Table 2).

5. HBPs in teaching hospitals have lower average FTE earnings than in non-teaching hospitals. (Table 3).

6. HBPs in small and medium hospitals tend to earn more on an FTE basis than those in large hospitals. (Table 4).

7. Average FTE earnings vary by region, with generally higher averages in the West and North Central regions, and lower ones in the South and Northeast regions. (Table 5).

The major findings of our contract analysis were:

1. More than 50% of the arrangements between hospitals and HBPs are oral.

2. Salary compensation arrangements tend to take an oral form; percentage arrangements are more likely to be written contracts.

3. Approximately 75% of the contracts were with group practices.

4. HBPs compensated under a percentage arrangement tend to receive far fewer fringe benefits, and pay more of their department's expenses than do HBPs compensated under a salary arrangement.

The results of the multivariate analysis reinforced the findings from the descriptive analysis that the difference between HBP compensation under a salary versus a percentage arrangement remains. This difference appears to exceed the additional expenses incurred by HBPs under a percentage arrangement. Hospital and area characteristics are more powerful in explaining differences in the type of compensation arrangement than in determining the amount of compensation. The variables which are statistically significant (region, teaching status and hospital size, and the physician-to-bed ratio) generally conform to the hypothesis that labor market conditions and bargaining power are major factors in the determination of the type of compensation arrangement.

The major findings of the exploratory case studies in New York State were that the prospective reimbursement system has contributed to a tendency for the hospitals to limit HBP remuneration, created incentives for the HBP to shift to a direct billing arrangement, and helped create an atmosphere that is not conducive to attracting HBPs to the State or retaining those that currently practice in New York.

Project Organization--The study was conducted by Arthur Andersen & Co., prime contractor, and InterStudy, subcontractor. The HCFA Project Officer was Fred J. Hellinger, Ph.D.

FTE COMPENSATION AMOUNTS BY SPECIALTY

SPECIALTY	SAMPLE SIZE	FTE EARNINGS		% OF HBPs WITH FTE EARNINGS OF			
		AVERAGE	STD DEV	< 50K	50K-100K	100K-150K	>150K
RADIOLOGY	358	$103K	$62K	19%	35%	32%	15%
PATHOLOGY	367	98K	68K	27	41	17	16
ANESTHESIOLOGY	105	80K	33K	13	64	21	2
CARDIOLOGY	579	63K	56K	45	44	6	5
EMERGENCY ROOM	350	55K	28K	59	35	5	1

Table 1

COMPENSATION ARRANGEMENTS BY SPECIALTY

SPECIALTY AND COMPENSATION ARRANGEMENT		SAMPLE SIZE	AVERAGE FTE EARNINGS	PERCENT OF HBPs WITH FTE EARNINGS OF			
				<50K	50K-100K	100K-150K	>150K
RADIOLOGY	- SALARY	78	53K	63	35	3	0
	- PERCENTAGE	181	124K	1	34	37	26
PATHOLOGY	- SALARY	114	49K	68	31	1	0
	- PERCENTAGE	156	138K	0	44	25	31
ANESTHESIOLOGY	- SALARY	57	62K	23	68	9	0
	- PERCENTAGE	19	87K	5	47	47	0
CARDIOLOGY	- SALARY	46	40K	91	9	0	0
	- PERCENTAGE	51	86K	4	71	16	10
EMERGENCY ROOM	- SALARY	108	40K	83	17	0	0
	PERCENTAGE	80	75K	30	66	4	0

Table 2

COMPENSATION AMOUNT AND TYPE BY HOSPITAL TEACHING STATUS

SPECIALTY AND HOSPITAL TEACHING STATUS	SAMPLE SIZE	AVERAGE FTE EARNINGS	PERCENT >100K	PERCENT COMPENSATED BY	
				SALARY	PERCENT
RADIOLOGY - T	192	$ 90K	37%	41%	35%
- N-T	166	119K	57	0	69
PATHOLOGY - T	194	67K	13	53	20
- N-T	173	133K	53	6	68
ANESTHESIOLOGY - T	55	80K	13	47	20
- N-T	50	81K	34	62	16
CARDIOLOGY - T	277	59K	7	14	7
- N-T	302	66K	14	2	11
EMERGENCY ROOM - T	117	49K	0	25	27
- N-T	233	58K	9	34	21

T: TEACHING

N-T: NON-TEACHING

Table 3

COMPENSATION AMOUNT AND TYPE BY HOSPITAL BED SIZE

SPECIALTY	HOSPITAL SIZE	SAMPLE SIZE	AVERAGE FTE EARNINGS	% OF HBPs ON	
				SALARY	PER-CENT
RADIOLOGY	<100 BEDS	39	$125K	0%	97%
	100-299 BEDS	146	111K	6	60
	>299 BEDS	173	91K	40	32
PATHOLOGY	<100 BEDS	28	108K	7	43
	100-299 BEDS	137	143K	10	71
	>299 BEDS	202	67K	49	23
ANESTHESIOLOGY	<100 BEDS	13	57K	85	8
	100-299 BEDS	28	88K	57	0
	>299 BEDS	64	81K	47	28
CARDIOLOGY	<100 BEDS	119	54K	0	1
	100-299 BEDS	178	61K	5	16
	>299 BEDS	282	68K	13	8
EMERGENCY ROOM	<100 BEDS	25	40K	16	32
	100-299 BEDS	170	59K	40	19
	>299 BEDS	155	52K	23	26

REGIONAL DIFFERENCES IN FTE COMPENSATION AMOUNT

SPECIALTY	WEST		NORTH CENTRAL		SOUTH		NORTHEAST	
	SAMPLE SIZE	AVERAGE FTE EARNINGS	SAMPLE SIZE	AVERAGE FTE EARNINGS	SAMPLE SIZE	AVERAGE FTE EARNINGS	SAMPLE SIZE	AVERAGE FTE EARNINGS
RADIOLOGY	109	$129K	87	$110K	66	$88K	96	$78K
PATHOLOGY	101	142K	93	82K	99	90K	74	71K
ANESTHESIOLOGY	3	168K	28	86K	46	72K	28	78K
CARDIOLOGY	89	70K	119	90K	306	52K	65	55K
EMERGENCY ROOM	137	67K	73	51K	77	50K	63	38K

Table 5

AN EXPERIMENT IN CASE REIMBURSEMENT FOR MEDICAL CARE

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AN EXPERIMENT IN CASE REIMBURSEMENT FOR MEDICAL CARE

This paper discusses an experimental program conducted by Pennsylvania Blue Shield (PBS) to test an alternative method of reimbursing physicians for inpatient medical care services. It often has been speculated that the traditional disaggregated fee-for-service arrangement provides incentives for physicians to deliver more services, encouraging longer hospital stays and increased health care costs. If so, it further may be hypothesized that these incentives can be modified to yield shorter hospital stays and reduced total costs per case, by adopting an equitable schedule of prospectively determined fee allowances designed to cover entire episodes of hospitalization, irrespective of length of stay.

PBS began to experiment with the Per-Case Reimbursement (PCR) concept as early as 1972. Findings presented here, however, concentrate upon that phase of the project conducted from July 1975 through June 1976 -- during which time the program had been expanded to include nine hospitals and sixty-one staff physicians who contributed useful experience data. A list of twenty-four well-defined and frequently occurring diagnosis categories was established, based upon ICDA classifications. Payment allowances were developed for each diagnosis category by bringing together data and information on average length of stay for given diagnoses, typical patterns of physician services reflected in PBS claims experience, and applicable medical price information from PBS data bases. Participating physicians agreed to accept the established payment levels as payment in full for services delivered to Blue Shield patients under the PCR program.

RESEARCH OBJECTIVES AND DESIGN

Objectives of the research and evaluation component of this project were: (1) to obtain quantitative measures of any changes in length of stay (LOS) that may be attributable to the case method of reimbursement; and (2) to examine the cost implications of any observed variations in length of stay.

The experimental design involved four comparative experience groups: (a) an experimental group consisting of cases with Blue Cross/Blue Shield patients satisfying predetermined criteria for eligibility in the experimental program; (b) a cross-sectional control group consisting of cases with patients satisfying the same selection criteria, but who were not covered by Blue Cross/Blue Shield and whose cases therefore were not reimbursed under the PCR method; (c) a longitudinal reference group representing experience for a population comparable to the experimental group, but occurring during an earlier time period -- specifically, calendar year 1973; (d) an analogously designed longitudinal reference group for the control population.

Data for the experimental population were extracted from PCR claim forms submitted to Blue Shield by participating physicians. Data for cross-sectional and longitudinal comparison groups were extracted from Hospital Utilization Program (HUP) and Professional Activity Study (PAS) records to which the participating hospitals had granted access.

Average LOS was computed for each design group, for each diagnosis category at each hospital. Changes or differences in LOS were measured and expressed in terms of simple arithmetic differences between average LOS for corresponding cells in different groups. Since length-of-stay data distributions tend to depart markedly from normal forms, nonparametric statistical methods were used in determining the significance of observed differences. The analysis

focused principally upon measurement of longitudinal changes in LOS occurring between the experimental group and its historical antecedent, and upon the comparison of these changes with corresponding changes in the cross-sectional control groups.

Cost implications were studied by comparing actual Blue Cross and Blue Shield payments for cases handled under PCR to the payment levels that might have been expected for these same cases if the PCR program had not intervened.

FINDINGS AND CONCLUSIONS

Forty-five hospital/diagnosis combinations satisfied minimum sample size requirements in all four blocks of the design; and longitudinal changes in average LOS were computed for these forty-five data sets (Table 1). A favorable outcome here may be defined as one in which average LOS showed a greater decline (or a smaller increase) for the experimental group than for the control group. By this definition, approximately half of the observed LOS changes were favorable, and half unfavorable. Looking only at the hospital/diagnosis combinations for which observed changes were statistically significant, however, the outcome was more definitive -- indicating nine favorable experimental outcomes, four unfavorable, and one that was for all practical purposes indecisive.

Closer examination of the comparative results revealed some striking differentials in experimental outcome at different hospital sites (Table 2). To measure the experimental program's effectiveness at any given hospital, the observed LOS change for the experimental group was adjusted by subtracting from it the corresponding control group change, which is assumed to be a reflection of the background trend in LOS at that hospital. Using this "net change" concept, four of the seven hospitals that produced enough data to be evaluated showed changes favorable to the PCR experimental group, two showed changes more favorable to the control group (one of which had an extremely

small base of experience and should perhaps be disregarded); and one showed no substantial difference between experimental and control group changes. Net reductions in average length of stay at sites more favorable to the PCR group ranged from 14 to 30 percent.

Ranking the experimental hospital sites on the basis of observed PCR effectiveness, and then also ranking them on the basis of their 1973 (pre-experimental) occupancy rates, the two sets of rankings were found to be strongly correlated. This indicates that PCR apparently is most effective in reducing LOS at hospitals with lower a priori occupancy rates. It supports a hypothesis that hospitals with low occupancy rates may seek to maintain higher occupancy by tolerating some slack in their lengths of stay; and that PCR then is effective primarily in reducing this slack to whatever degree it exists.

Translating observed LOS changes into their accompanying cost implications, Table 3 displays a summary of the differences between actual and expected Blue Cross/Blue Shield payments for experimental cases at each of the six hospitals yielding enough experience to be so evaluated. Two of these experimental sites show apparently adverse financial results. To explain these negative outcomes, it may be noted that the bad financial outcome at hospital E arose from the fact that average LOS increased for both the experimental and control populations. The LOS increase for the experimental group, however, was considerably less than for the control group; and in this sense, the PCR method was in fact successful here. At hospital D, it was found that a sizable expansion had been undertaken between 1973 and 1975. It can be conjectured that there may have been great pressure here to maintain the occupancy rate, contrary to PCR incentives.

In general, the PCR method of reimbursement can be expected to result in higher levels of Blue Shield payout to physicians. This does not mean

that physicians are being granted a price increase for services delivered to PCR patients. The incremental Blue Shield payout more correctly should be seen as the difference between a "full payment" plan and Blue Shield's normal reimbursement schedules (which frequently provide less than full payment). It represents that portion of the physician's total charge that otherwise would be an out-of-pocket expense for the patient, if it is paid at all.

At those hospitals where an LOS reduction is achieved and is greater than the reduction that might otherwise have been expected on the basis of prevailing LOS trends, the increased Blue Shield payment to physicians is more than compensated by reduced Blue Cross payments to the hospitals. A favorable trade-off always is assured by the simple fact that an inpatient hospital day costs considerably more than does a physician's hospital visit. The difference between those two cost components becomes the dollar value of each day of hospital utilization saved.

In summary, results obtained from the PCR experimental program provide reasonably conclusive evidence that the case method of reimbursement can be effective in promoting shorter lengths of stay for inpatient medical cases. The effectiveness of this method of reimbursement varies quite greatly, however, from one hospital to another. Although the reasons for these differences in response to PCR are not entirely clear, they can be explained at least partially by the hospitals' a priori occupancy rates -- leading to conclusion that hospitals with lower occupancy rates tend to have more slack in their average lengths of stay, and that the case method of reimbursement is effective primarily in reducing this slack to whatever extent it may exist.

TABLE 1. LONGITUDINAL CHANGES IN LENGTH OF STAY FOR EXPERIMENTAL AND CROSS-SECTIONAL POPULATIONS

(Change from 1973 to experimental period, 7/75-6/76)

HOSPITAL/DIAGNOSIS CATEGORY	LOS Change (Days)*	
	Experimental Population	Cross-Section Population
HOSPITAL A		
Asthma	-5.4 *	-3.5 *
Bronchitis and Broncheolitis: Acute	+0.3	+0.4
Diabetes Mellitus	+0.5	+0.1
Ulcer: Gastric, Duodenal, etc.	-1.8 *	-1.9 *
Gastritis and Duodenitis	-1.2 *	0.0
Gastroenteritis	-0.8	-0.1
Ischemic Heart Disease:Acute	-2.5	+0.8
Ischemic Heart Disease:Subacute, etc.	-1.0	-0.7
Pneumonia	-0.2	0.0
Symptomatic Heart Disease	+1.5	+0.4
Thrombophlebitis	-4.3 *	-0.5
Upper Respiratory Infection	+0.6	+0.5
HOSPITAL B		
Gastroenteritis	+0.6	-0.2
Ischemic Heart Disease:Acute	-1.5 *	+3.6
Ischemic Heart Disease:Subacute, etc.	+1.1	-0.3
HOSPITAL C		
Bronchitis and Broncheolitis:Acute	-1.7	-3.2
Ulcer:Gastric, Duodenal, etc.	-2.0 *	-1.8
Ischemic Heart Disease:Acute	-2.8 *	+0.6
Ischemic Heart Disease:Subacute, etc.	-0.2	+0.1
Pneumonia	-2.0	+1.2
Symptomatic Heart Disease	-0.7	+3.2

(Table continued on next page)

* Indicates LOS change is statistically significant at the .10 level.

TABLE 1. (CONTINUED)

HOSPITAL/DIAGNOSIS CATEGORY	LOS Change (Days)*	
	Experimental Population	Cross-Section Population
HOSPITAL D		
Bronchitis:Chronic/Unqualified	+0.7	-1.1
Cerebrovascular Disease	-4.0	-7.8
Diabetes Mellitus	-5.1 *	-1.0
Gastroenteritis	-0.6	-0.8 *
Hypertension	+5.3	-1.0
Ischemic Heart Disease: Acute	+1.2	-2.0
Ischemic Heart Disease: Subacute, etc.	-2.5	-0.7
Pneumonia	+0.4	-0.7 *
Symptomatic Heart Disease	-0.8	-2.4
Upper Respiratory Infection	+0.2	+0.1
HOSPITAL E		
Bronchitis and Broncheolitis: Acute	-1.3	-2.0 *
Gastroenteritis	+0.7	-1.4 *
Ischemic Heart Disease: Subacute, etc.	+0.3	0.0
Pneumonia	-0.4	+3.6
HOSPITAL F		
Asthma	+0.5	+0.2
Bronchitis and Broncheolitis: Acute	-1.1	+0.2
Bronchitis: Chronic/Unqualified	-0.5	-1.0
Diabetes Mellitus	+1.6	0.0
Gastroenteritis	-0.6	+0.2
Hypertension	-4.0 *	+1.6
Ischemic Heart Disease: Acute	-0.9	+3.0 *
Ischemic Heart Disease: Subacute, etc.	+0.2	-0.1
Pneumonia	+1.2	-0.1
HOSPITAL G		
Pneumonia	+0.8	+0.2

* Indicates LOS change is statistically significant at the .10 level.

TABLE 2. AVERAGE CHANGE IN LENGTH OF STAY, BY HOSPITAL

HOSPITAL	Number of Diagnosis Categories Represented	LOS Change from 1973 to 7/75-6/76 Period			
		Experimental Population		Cross-Section Population	
		Days	% Change	Days	% Change
A	12	-1.6	-19%	-0.4	- 5%
B	3	-3.1	-28%	+0.2	+ 2%
C	6	-1.9	-24%	-0.8	+10%
D	10	-0.1	- 1%	-0.8	-11%
E	4	+0.1	+ 2%	+1.3	+20%
F	9	+0.3	+ 4%	+0.6	+ 3%
G	1	+0.9	+14%	+0.2	+ 3%
OVERALL	15	-0.2	- 3%	0.0	0%

TABLE 3. SUMMARY OF DIFFERENCES BETWEEN ACTUAL AND EXPECTED PAYMENTS, BY HOSPITAL

HOSPITAL	EXPERIMENTAL CASES REPRESENTED	GAIN (LOSS) FOR PROGRAM			GAIN (LOSS) AS PERCENT OF EXPECTED PAYMENT		
		Blue Shield	Blue Cross	BC/BS Combined	Blue Shield	Blue Cross	BC/BS Combined
A	249	($ 860)	$ 9,273	$ 8,413	(3.7%)	6.1%	4.8%
B	82	($1,335)	$ 6,414	$ 5,079	(15.5%)	7.0%	5.1%
C	82	($ 94)	$ 1,469	$ 1,375	(1.2%)	2.1%	1.8%
D	176	($ 277)	($12,184)	($12,461)	(1.7%)	(8.3%)	(7.6%)
E	92	($ 801)	($ 2,819)	($ 3,620)	(10.3%)	(4.6%)	(5.3%)
F	144	$2,697	$ 5,997	$ 8,694	19.3%	4.7%	6.1%

Dr. Wennberg
February 1978

Small Area Variations in Surgical Procedures in New England: Some Policy Implications

The paper summarizes major findings concerning small area analyses in Vermont and in other New England States. The initial observation of the extent of variations in per capita use of health care was based on cross sectional data in Vermont for 1969. The findings have been confirmed by subsequent studies in Maine, Rhode Island, and Massachusetts as well as Vermont. The variations appear to relate to differences in the per capita numbers of suppliers and to the differences among individual physicians in their philosophies concerning the value of or need for a particular treatment. They do not appear to relate systematically to differences in populations, either in their behavior in seeking care or in underlying differences in morbidity.

Significant variations in use of care is the rule rather than the exception; most hospitalizations, whether classified according to reason for admission or by type of surgical treatment, vary so as to raise twin concerns; do the variations indicate unnecessary care? Do they indicate medical iatrogenesis?

The paper concerns these and related implications of our studies with regard to the efficiency, effectiveness and equity of the health care delivery system. The interpretation is that most medical care activities are undertaken in what may be described as a vast gray zone of uncertainty concerning the utility of the service with regard to the explicit objective of health care, the improvement of health. The pervasiveness of the uncertainty as to the fundamental values of the activity means that the issue of relative efficiency with which a particular service is delivered is a secondary issue.

And the problem of equity of access itself becomes complicated.

The problem is well illustrated by the issue of tonsillectomy and cesarean sections. Use of these procedures varies extensively: in some areas, 16% of children are tonsillectomized; in others 65%; in some areas and times, 4% of mothers have deliveries by cesarean; in others, 13%. Cost containment efforts directed towards investigating and improving the relative efficiency of the production of these procedures misses the major determinant for expenditure variations, which is the decision that the procedure is, in fact, indicated.

The problem of equity evolves into an issue of the appropriateness of accessed services.

SECOND SURGICAL OPINION:

SALVATION OR SHAM

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The dramatic increase in the amount of elective surgery performed during the past half decade has focused attention not only on the explanations for the rise but also on the issue of surgical necessity. The rate of surgery up to the early 1970's remained at a fairly stable rate consistent with population growth rate. After 1971, however, there has been an explosion in the number of operations performed; e.g., 15.8 million operations in 1971; 18.4 million operations in 1973; two years later 20 million procedures were performed; and in 1976, it is estimated that over 21 million operations were performed. From 1971 to 1976, the rate of surgery increased 3.5 times faster than the population rate.

While the explanations for the rapid growth in surgical rates are elusive, the figures do suggest that some effort should be made to evaluate the medical necessity of recommended elective surgery. It would seem appropriate that a review of the necessity of recommended elective surgery (non-emergency procedures) should be encouraged before the operation is performed. One such program, second opinion elective surgery program, is designed to have some impact on stemming the growing rates of surgery and the concomitant costs. Specifically, the objective is to screen those elective surgical procedures that could otherwise be deferred or prevented without jeopardizing the health and well-being of the individual.

The Cornell University Medical College second opinion elective surgery program owes its existence to the union and management trustees of several Taft-Hartley security welfare funds in the greater New York City area. It is a prospective study, in operation since 1972, funded since 1974 by the Social Security Administration.

The program relies on a board certified surgeon's evaluation of the necessity of elective surgery as the next therapeutic step for patients who

have been recommended for surgery. All ancillary tests required to complete the consultation are paid for by the security welfare funds.

The consultant either confirms the need for surgery; e.g., agrees that surgery should be performed, or does not confirm the need for surgery; e.g., feels that the diagnosis which would normally indicate surgery is incorrect or that the diagnosis is correct but that medical treatment, not surgery is warranted. The recommendation for medical treatment, however, does not preclude the possibility of surgery at a later date.

The decision to undergo surgery always rests with the individual regardless of the consultant's recommendation. One important caveat is that the consultant cannot perform the surgery should the individual decide to have the operation.

This program is not designed to measure reliability between physicians nor is it designed to measure differences of opinions. This is a consumer-oriented program whose objective is to assist the patient to make a more informed decision regarding previously recommended surgery.

There are two types of second opinion programs: voluntary and mandatory. The former relies on the individual's initiative to utilize the benefit. Only 10-15 percent of the potentially eligible elective surgery candidates take advantage of the program. These individuals are usually faced with major surgery and, for a variety of reasons, may question the efficacy or the outcome of the surgery, or may have decided not to have surgery performed and are seeking reassurance that no surgery is the best course of action.

Mandatory programs require that each insured member and dependent have a second opinion in order to obtain basic hospitalization and physician coverage for an elective surgical procedure. Approximately 85 percent of the eligible surgery is screened, hence, a more accurate cross-section of surgical procedures is seen. Although a consultation must be arranged, this is not to imply

that the patient has to accept the consultant's recommendation in order to receive benefits. In addition, each member and dependent is permitted one 'forgiveness' whereby benefits will be paid if surgery is performed without a consultation being arranged.

The study population consist of 655,000 individuals: roughly 535,000 individuals are members of security plans with a voluntary program and 120,000 are members of security plans with a mandatory program. In order to evaluate the impact and effectiveness of the second opinion program, the outcome status of the study population over time is measured by four follow up telephone interviews scheduled at six month intervals. Specifically, all those not confirmed for surgery and a matched, randomly selected sample of confirmed for surgery cases are included in the follow up study. Surgery and medical treatment status are monitored over a two year period of time. It is specified in the research design that any individual who reports no medical treatment for two consecutive callings is considered to be asymptomatic and exits the study.

Discussion will focus on the most recent findings from first and second follow ups (calls made six months after the consultation and one year after the consultation, respectively). Economic savings in the form of claims reductions will be delineated and the Sentinel Effect will be documented. The spread of second opinion programs across the country is discussed and legislative action will be reviewed.

UTILIZATION REVIEW IN THE UNITED STATES: RESULTS FROM A 1976 NATIONAL SURVEY OF HOSPITALS*

The Study

The federal government has required hospitals to implement utilization review (UR) programs since the inception of Medicare in 1966. Over the years since then, major revisions have been introduced in the requirements and organizational mechanisms of those programs. However, it has been difficult to assess the impact of UR programs because of a severe paucity of detailed information about them and about the effect of the revisions.

This report represents the results of a national probability-sample survey of hospital utilization review activities, which was carried out to partially fill the gap in our descriptive knowledge about hospital utilization review programs.

The basic data in this report were gathered through a set of questionnaires sent to 1,003 hospitals in the United States; the set comprised a 78-item questionnaire to be completed by the utilization review committee chairman and his staff and a 10-item opinion questionnaire for hospital administrators. The survey started in October 1976 and ended in March 1977.

Five hundred twenty-six hospitals (52.4%) returned one or both questionnaires, with 435 returning the detailed UR questionnaire, 411 returning the administrator's questionnaire and 320 returning both instruments. There was a significantly lower response rate from small hospitals; but weighted adjustments were made to produce estimates of utilization review activities for all Medicare-certified hospitals nationwide. Average lengths of stay for Medicare patients in 1976 showed no overall differences between respondents and nonrespondents. It should be noted that there were no other data bases against which to validate independently most of the responses; indeed, the absence of data was a major reason for this survey to be performed. Therefore, with the level of response obtained, there is a possibility of bias in the data reported.

This report contains detailed information on not only federally funded review activities, but also on other utilization review programs being

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carried out by hospitals. The results of the survey have enabled us to elucidate the national trends in UR activity since 1972, describe the extent and variability of UR activities in 1976, identify factors influencing variations in UR programs and elicit patterns of opinions held by hospital officials about UR programs. A brief synopsis of each of these is presented below.

National Trends in Utilization Review: 1973-1976

The Professional Standards Review Organization (PSRO) legislation, restructuring the organization of hospital review activities for Medicare and Medicaid was passed in the fall of 1972. In March 1974, the PSRO program issued guidelines detailing proposed requirements for: concurrent review of all Medicare and Medicaid admissions and extended stays; and audits of the quality of care (medical care evaluation studies). In November 1974, new Medicare and Medicaid regulations were issued, which proposed similar concurrent UR and audit requirements for hospitals to apply until local PSROs were established and could assume authority over hospital review activities. These were subsequently challenged, the admission review components enjoined by a federal district court; the whole package of proposed regulations was withdrawn, and a new set of extended stay review regulations was promulgated in the summer of 1976. By this time, PSROs and hospitals that had recieved delegated review authority from PSROs were performing admission and extended stay review for over one-quarter of all Medicare hospital cases. Between the initial PSRO legislation in 1972 and fall 1976, there appears to have been a major transformation in the extent of hospital utilization review activities. Weighted estimates, based on data from the hospitals responding to our survey, indicate that the following changes took place in the four years from 1973 to 1976:

- -The percentage of hospitals performing concurrent extended stay review climbed from 46% to 90%;

- -The percentage of hospitals carrying out concurrent admission review programs jumped from 9% to 60%;

- -The percentage of all Medicare-certified hospitals using their UR authority to recommend termination of a patient's hospital insurance benefits in at least one case per year, because of unnecessary utilization, rose from 27% to 59%;

- -The average number of UR terminations reported climbed by a factor of almost three, and the median number of medical audits of the quality of care in respondent hospitals rose over six-fold.

By the end of 1976, the majority of hospitals, even those not required to do so, were voluntarily carrying out concurrent admission review programs for Medicare and Medicaid patients. Throughout the nation,

almost two-thirds of all hospitals had some form of concurrent extended stay review for Blue Cross, commercial insurance, and self-pay patients, and over one-third were performing admission review. Ten percent of hospitals were even performing preadmission review for some of their elective admissions.

Variability and Extent of Utilization Review Activities in Hospitals in 1976

While there was a clear pattern of increase of UR activities nationally from 1973-1976, the type and extent of utilization review activities varied from hospital to hospital. Of the 435 respondent hospitals, 294 had only internally administered concurrent utilization review programs, 59 hospitals had concurrent review programs, some of which were administered by the hospital and some by external organizations, 15 hospitals had internally administered retrospective and concurrent review programs, 21 hospitals had only retrospective review programs internally administered and, 18 hospitals had all utilization review performed by external groups; in 28 cases, either there was insufficient data to classify the UR programs or the hospital claimed to have no UR programs. Evaluating the level of concurrent review efforts produced these national estimates based on the survey data: in 25% of all Medicare-certified hospitals, 100% of admission and extended stay review was being done for all patients; in 44% of these hospitals, both admission and extended stay review programs existed, but review was either not performed for all major payor groups or not performed for all patients within a payor group; in 16% of the hospitals, no admission review programs existed, but extended stay review was done for all third-party payor beneficiaries and self-pay patients; in 9%, no admission review was performed, and extended stay review was done only for Medicare and Medicaid patients; and in 5%, less extensive review or no utilization review was performed. Dozens of different "types" of hospital utilization review programs were identified by factors of a) whether the UR programs were administered internally or externally, b) whether review was done concurrently or retrospectively, or both ways, c) which payor groups review was performed for, and, d) whether review was done on all patients or only a sample of patients within each major payor group.

While this report provides overall national estimates of average hospital activities in 1976, most of the quantitative analyses were undertaken to identify systematic differences in UR; the analyses focus on the large subpopulation of hospitals that had internally administered concurrent UR programs. This emphasis was chosen both because of the need to insure consistency in the analyses and because most institutions with externally conducted programs could not provide precise data on the level and cost of such UR activities in their hospitals. The report also contains analyses of medical audit activities and opinions of hospital officials about UR programs from all hospitals, since these would not be inherently affected by these factors.

The summary table on the next page presents average individual hospital measures of some utilization review activities. These averages, however, should not be taken as "typical" since almost all distributions were highly skewed to the left, and the median hospital usually had values for these parameters that were considerably less than the average. In fact, the hallmark of the simple descriptive tabulations and statistical analyses was the wide variation that existed among institutions. While many statistically significant simple correlations existed between measures of UR structure (e.g., number of payor groups reviewed), resource inputs (e.g., nonphysician staff levels), processes (e.g., number of reviews) and results (e.g., terminations), the magnitude of the association was often weak, with correlation coefficients frequently under 0.25. Two-way cross-tabulations of variables, each broken into standard descriptive categories, usually led to cell means with coefficients of variation greater than unity. The best multivariate analyses of the number of reviews performed per hospital explained 60% of the variation; the best equation for the estimated cost of review activities per hospital explained 41% of the difference between hospitals; and the best analysis of variance of the number of extended stay terminations accounted for only 28% of the variation among hospitals. It should be noted that the survey did not gather data on factors such as case-mix of patients, availability of nursing home beds, etc., which might have explained some additional part of this variation. Some highlights follow of factors that did turn out to play a role in explaining variation among institutions in extent of review coverage, in review volume, in cost per review, and in the number of terminations:

Extent of Review and Review Volume: Hospitals in the northeastern and north central regions tended to perform concurrent utilization review on all patients more frequently than those in the southern and western regions of the country. Further, even after controlling for the extent of utilization review coverage and the size of the hospital, northeastern and north central hospitals performed more admission and extended stay reviews per month than did hospitals in the South and the West. Hospitals that were delegated authority by their area PSRO to perform binding review for Medicare and Medicaid patients tended to have more extensive review program coverage than other hospitals and performed comparatively more admission and extended stay reviews per month than those not delegated. After controlling for basic volume factors, such as hospital bedsize and extent of review program coverage, the variable that explains most of the variation in number of reviews performed was the number of utilization review full-time equivalent staff members employed by the hospital.

Cost Per Review: The key factor affecting actual expenditures by a hospital for utilization review activities is the hospital's policy on compensating physicians. Of the hospitals that responded to questions about paying physicians, 79% reported that they did not compensate any of the physicians for their UR activity,

Summary Table of Estimated Individual Hospital Utilization Review Inputs and Activities in 1976

Number of Admission and Extended Stay Reviews Performed**	6,144 reviews per year
Number of Cases Subject to Medical Quality Audits*	408 cases audited per year
Number of Cases of Unnecessary Utilization Leading to Terminations of Health Insurance Benefits**	11 extended stay review and 1 admission review terminations per year
Physician-Hours Devoted to UR Activities**	235 physician-hours per year
Direct Hospital Cost for UR Activities, Physician and Non-Physician Staff**	$35,880 per year

*National estimate based on data from all respondent hospital-conducted UR programs

**National estiamte based only on data from respondents with internal concurrent UR programs

14% said they compensated only some of the physician participants (e.g., just the UR committee chairman), and slightly less than 7% reported paying all physicians who participated in hospital UR activities. Only 13% of hospitals delegated to perform binding review by the PSRO said they compensated all physicians. To assess variation among hospitals in the cost per review, the actual reported expenditures for nonphysician staff were combined with an estimated valuation of physician time of $35 per hour of reported UR work, which was the most frequent compensation in those hospitals that did pay. Using this hypothetical cost estimate, we could account for 41% of the variation in cost per review among respondent hospitals. The significant factors in the regression equation were the total volume of reviews performed and whether more than 100 reviews per month were performed. Hospitals performing less than 100 reviews per month had costs that were more than double the average for all other hospitals. When we excluded hospitals with these small review volumes, we could demonstrate small economies of scale. For hospitals performing between 100 and 500 reviews per month, there is a marginal decline starting at 46¢ per 100 reviews dropping to 40¢ per 100 reviews for each 100 reviews interval over this range. For hospitals performing between 500 to 1500 reviews, the cost per 100 reviews declines from less than 40¢ per 100 reviews to 26¢ per 100 additional reviews, moving from 1400 to the 1500 reviews per month. Beyond this point, smaller declines in costs are achieved for additional reviews. The actual reported cost of reviews performed in PSRO-delegated respondent hospitals tended to be less than the average for all other hospitals. This may have been due, in large part, to the fact that these hospitals performed more admission and extended stay reviews. When such effects of scale are held constant, there is a borderline statistically significant indication that PSRO-delegated hospitals have slightly greater costs per review.

Terminations of Health Insurance Benefits: Extensive analyses were performed of the differences among hospitals in the number of cases for which continued hospitalization was deemed unnecessary by a hospital's UR program and termination of further health insurance benefit coverage was recommended. The best level of explanation obtained was only 28%, in a two-way analysis of variance of the number of extended stay terminations per hospital. However, several unanticipated findings emerged from these analyses. First, it appeared that, after controlling for volume effects such as bedsize, hospitals with more extensive review programs tended to have fewer terminations than hospitals with more restricted review programs; i.e., hospitals reviewing only Medicare and Medicaid patients had higher termination rates than those reviewing all patients. Partially confirming this finding was an indication that the number of terminations per hospital and per 100 reviews increased as the proportion of review activity related to Medicare increase. One may speculate that proportionately far more terminations occur among older or chronically ill patients, who need

long-term institutional care instead of acute hospital care, than among younger patients. One of the stimuli for utilization review programs was the observation in the 1950s that many elderly patients in acute-care hospitals should have been in nursing homes. The last factor that might help explain the variations in terminations per hospital and per 1000 reviews was the hospital's relationship with the PSRO. Many of the analyses of variance indicated that hospitals that performed delegated binding review for the PSRO had lower levels of terminations than other hospitals; in a few of the analyses, this effect was statistically significant. However, since the negative effects usually showed up in analyses that involved less than half of the respondent hospitals, and because PSRO-delegated hospitals tended to do more extensive review, this PSRO effect could be due to chance and should not be over-generalized.

In general, considerable caution should be exercised in any policy application of this survey's findings.

Opinions of Hospital Administrators and Utilization Review Chairmen

Some of the most interesting findings of this national survey were the perceptions of hospital administrators and UR committee chairmen about utilization review. Highlights of their opinions are:

-39% of administrators and 36% of UR chairmen felt that more than 5% of hospital use in the nation was unnecessary; 20% in both groups felt that more than 10% of all hospital use was unnecessary.

-22% of UR chairmen and 17% of hospital administrators felt that more than 5% of all patient days in their own hospital were unnecessary.

-23% of UR chairmen and 27% of administrators felt that more than 5% of all ancillary services provided in their hospital were unnecessary.

-75% of administrators and chairmen felt that utilization review programs had had a positive impact on the quality of patient care.

Perhaps the single most striking finding of the survey was the response to the questions about whether the respondents would continue utilization review and medical audit programs even if all federal and private requirements for conducting them were removed. The answers were as follows:

-Among hospital administrators, almost 99% would continue extended stay review programs, 96% would voluntarily continue

medical care evaluation studies, 82% would continue admission review programs and 36% would have pre-admission review programs.

-Among utilization review committee chairmen, 77% would favor voluntary continuation of extended stay review programs, 73% would continue medical audit studies, 62% would continue admission review programs and 21% would have pre-admission review programs.

The majority of administrators and UR chairmen, however, would not continue to review 100% of all admissions and extended stays, but would develop some sampling or other selective basis for these reviews.

While these opinions might seem to constitute a solid vote of support for UR programs, it is possible that these results are biased by responses only from those more favorably disposed towards utilization review.

Possible Policy Implications of the Survey Findings

In the opinion of the investigators, the survey findings have two major implications for planners and decision-makers concerned with hospital utilization review programs. First, it appears that the structural goals of hospital utilization review programs are being met. Utilization review programs have been set up in almost all institutions; frequently, more patients are being reviewed than is required by state or federal regulations; medical audits of the quality of care are being performed in considerable numbers; hospital review committees are, in at least a small number of cases per institution, using their powers to terminate the continued hospitalization of patients who no longer need acute hospital care; substantial full-time levels of staff in each institution are devoting time to utilization review activities; and, in a small percentage of institutions, UR activities have led to disciplinary actions against physicians. Further, there is apparently a percieved need and considerable support for utilization review programs by hospital officials. The survey does not tell us, however, whether dollar savings or quality improvements commensurate with the investment of resources have been or will be achieved. In fact, the second major implication of the survey findings, in our opinion, is the preliminary evidence that, with all other factors held constant, there may be relatively decreasing benefits from programs that conduct admission and extended stay review on all patients, as compared to programs that do not review all patients. Except for an indication that more terminations may result in UR programs proportionately devoting a high percentage of review efforts towards Medicare patients, however, it is not clear what the focus of utilization review programs should be in terms of achieving an optimal benefit-cost ratio. With tens of millions of dollars being spent annually for utilization review programs, it seems that investments in further evaluations and experiments to improve both the efficiency and the effectiveness of hospital UR programs might well be worthwhile.

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